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An Argus Specialist Publication

No. 64
May 29-Jun 4, 1984

45p

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MUMMY MUMMY

New micros: 'Too little too late'

Commodore has reacted with derision to plans by 15 Japanese computer makers to set a software-compatible standard.

Marketing boss John Baxter said: "How can you set a standard when, by the end of the year, we will have outsold them by 10 to one?

"It's too little too late. If they had tried in 1981 I think they would have had a tremendous impact. But now we and Sinclair have sold between us 10m machines.

"There's no possibility of us adopting the MSX standard."

Computers were not like video or audio where a common format worked — new computers needed enhanced languages to take advantage of new developments.

MSX assumed computers did

Continued on page 6

New quiz goes pop

Jump to the beat and test how much you know about pop in Stuart Henry's Pop Quiz, from Bellflower. Whether you're crazy about current music or tuned in to the sounds of the sixties, there's something for you in this game.

Radio Luxembourg disc jockey Stuart Henry has verified more than 750 questions, ranging from the

Continued on page 6

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Several Japanese computer makers are set to launch a range of software-compatible micros. We have the first full details

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HOME COMPUTING WEEKLY
BRITAIN'S BRIGHTEST

• All the listings in Home Computing Weekly are tested for quality and checked for accuracy. There are programs for these computers in this issue

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Spectrum 8
Two games. Watch out for the creepy-crawlies!

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Now your duck has a chance for revenge

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Draw masterpieces the easy way

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What will you risk on the roll of the dice?

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Use your skill and strategy

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HCW 64

MSX: What it means to you

With new standard Japanese micros due here in three months, Paul Liptrot presents the first full report

High street chains will be selling the first wave of Japanese MSX standard computers by September. Prices are expected to be around £200 for 32K models with 64K versions also available.

And the makers predict they will capture 15 per cent of pre-Christmas sales — rising to one third of the UK market next year.

The first MSX computers to go on sale in the UK. Clockwise from top left: Hitachi, Teleton, Sanyo, Mitsubishi, Sony, Toshiba. Centre: Canon. Missing from picture: JVC

MSX means that software and peripherals for one micro will also work on others using the MSX standard.

And, although designed for home use, when MS-DOS is added later for disc drives, files — but not programs — from 16-bit computers like the IBM PC can be used on MSX micros.

Microsoft, which wrote the industry standard BASIC, spent 14 months developing MSX for 15 Japanese manufacturers, using the eight bit Z80A processor. MSX computers have been on sale in Japan for several months.

But won't MSX hold back development? David Fraser, general manager of Microsoft, compared home computers with records and video and said: "Without a broad standard development has gone on ad hoc and in different directions. It's difficult to develop software for a moving target.

"It was very expensive for software houses to write for several standards: now they could start being more creative."

He said: "Sinclair will not follow any standard. He produces low cost products which are not 'me-too' but 'me first'. We are talking to Commodore on various things, from MSX to MS-DOS."

Many leading UK software houses are planning MSX products. They were given a secret preview several weeks ago with the opportunity of having pre-launch models provided they signed non-disclosure agreements.

Among them is Psion, Sinclair specialists with 3m packages sold, which plans to have software out at the same time as the new computers.

Chairman and managing director David Potter said: "I think that, because of the marketing ability of the Japanese, there's no question that they will have a substantial market share. That's not to say they will be dominant, but they will be a major force."

UK and US makers could reply to MSX, and claims that it would stifle development, by bringing out advanced computers like the QL and Apple's Mackintosh.

Psion developed the QL software but Dr Potter said the QL was in a different league from MSX machines, particularly because of its greater power.

Lasky's chief executive, Peter Klein, said he hoped British, European and US home micro makers would adopt MSX. Compatibility meant stores could stock a wide range of add-ons and software without today's unacceptable risks and stock costs.

As well as a disc-based MSX-BASIC interpreter, Microsoft is also working on FORTRAN, BASIC, COBOL and Pascal compilers plus an MSX version of the Multiplan spreadsheet.

This is the minimum agreed MSX specification.

Processor Zilog Z80A or equivalent, running at just over 3.579 MHz. **Video display** Texas Instruments 9918A or equivalent. **Interface** Intel i-8255 or equivalent.

Memory: 32K ROM. Minimum of 8K RAM, expandable through bank switching to a maximum of 1024K.

Display: 256 x 192 high resolution, 40 x 24 text with 16 colours.

Sound: three voices, each with a range of eight octaves, with a fourth noise channel available. Each may be modulated using one of 10 envelope waveforms. Sound generator is General Instruments AY-3-8910 (as used by Oric) or equivalent.

Cassette interface: FSK modulation, 1200 or 2400 baud.

Input/output: one joystick port, cartridge port, expansion bus.

Standardised optional extensions: 80-column text screen, clock, RS-232 interface, floppy disc, printer.

Version 4.5 Microsoft BASIC for MSX

Commands, statements and functions

ABS
ASC
AUTO
ATN
AND
CLEAR
CONT
CHR$
COS
CSRLIN
CLOAD
CLOAD?
CSAVE
DATA
DELETE
DEF FN define function
DEFINT/SNG/DBL/STR
END
ERROR
EXP
ERL/ERR
FOR
FRE
GOSUB
IF THEN
IF GOTO
INPUT
INKEY
INP
INST
INT
LET
LIST
LLIST
LPOS
LPRINT
LPRINT USING
LINE INPUT
LEFT$
LEN
LOG
MID$
NEW
NOT
ON ERROR GOTO
ON GOTO
OUT
OR
PEEK
POKE
PRINT
PRINT USING
POS
RENUM
RUN
READ
REM
RESTORE
RESUME/0/NEXT/line no.
RIGHT$
RND
STOP
SGN
SIN
SPACE$
SQR
STR$
STRING$
TRON/TROFF
TAB
TAN
USR
VAL
VARPTR

Expanded statements and functions for MSX

BEEP
BSAVE for m/c programs
BLOAD
BINS
CLS
COLOR
CIRCLE
CLICK enables/disables keyclick
CSAVE
CLOAD
DRAW
INTERVAL ON/OFF/STOP
INPUT from specified channel
KEY assigns string to function key
KEY LIST displays list of function keys
KEY ON/OFF/STOP
LOCATE
LINE
LOAD
MOTOR
MAXFILES specifies max. no. of files open at one time
MERGE
ON KEY GOSUB
OPEN device: **CAS** cassette, **GRP** graphics screen, **CRT** screen, **LPT** line printer
PRINT output to specified channel
PUT SPRITE set up sprite attributes
PSET/PRESET sets/reset specified sound notes
PLAY music
PLAY status of music queue
PDL returns value of paddle
PAD returns value of touch pad
SCREEN selects mode
SPRITE ON/OFF/STOP
SOUND
SAVE
STICK returns direction of joystick
STRIG status of joystick trigger
TIME
VPOKE to video RAM
VPEEK
WIDTH of screen in text mode

Pop quiz

From front page

Beatles to Boy George. An unusual feature of this game is that a donation is given to the Stuart Henry Multiple Sclerosis Society Research Fund for every copy sold.

David Gordon, Bellflower director, said: "This game aims to give kids and their reasonably young parents an equal chance. The proportion of contemporary music to older sounds is about 2:1. We ask more specific questions about music of the 80s, but more general, well-known questions on the the 60s."

There are six rounds and the questions increase in difficulty as you progress. The questions are chosen at random so the chances are that you will never play the same game twice. The computer selects one of nine master questions, each in turn with 14 subquestions.

At the beginning of each round the computer composes a short tune in the scale of C. Each time you answer a question correctly you can guess a note. This part is like a musical hangman game. If you guess correctly you get 10 bonus points. If not, 10 points are deducted. As the game goes on the tunes get harder and you must complete the tune before your bonus points run out. You don't have to know music, but it is an advantage.

Mr Gordon said: "After we saw the documentary on Stuart Henry on Channel 4, my partner and I wanted to raise money for sufferers of multiple sclerosis. We are giving our writer's royalties to the Multiple Sclerosis Society and Stuart is making a practical contribution. He is promoting the game on Radio Luxembourg and starting a regular quiz at the weekend when he will give away copies of the game as prizes."

"W. H. Smith is also helping the fund by accepting a lower discount than normal on its first order of the game," he continued.

"Multiple sclerosis is the most common organic disease of the central nervous system," Mr Gordon said. "In Britain 50,000 people suffer from the disease, which, although not terminal, can be debilitating. More than half of the sufferers show no symptoms, but others may be incapacitated and some, like Stuart Henry are confined to wheelchairs. Stuart Henry is one of the comparatively lucky ones in that he still works, but others are forced to completely change their way of life.

"However, although we are supporting the fund, we don't intend that people should buy our game purely from charitable motives. We want them to buy it and enjoy it because it's a great game."

Bellflower, 6 Rosewood Ave, Greenford, Middx

From front page

not move forward. It was already out of date and had not even set a standard in the maker's home country.

He believed that sales of the new Amstrad computers alone would be greater than six or seven of the Japanese manufacturers put together.

And Commodore had sold more in a year in Italy alone than the MSX micros would sell in the whole of Europe in the same time.

As an example of languages moving on, he mentioned Commodore's next home computer, the 264, and its BASIC Four-Plus which, he said, had all the features of BBC BASIC and more.

Sinclair Research said it also had no plans to adopt the MSX standard.

- Compu-Net, a network for Commodore 64 users offering services like home shopping and telesoftware, is due to be launched next month. Hard-wired modems, costing about £100, will include the first years subscription, usually £20. Run by an independent company, it will at first be exclusive to the 64 and the new Commodore computers. But then it will be offered to users of other micros.

Turn to page 5 for a full eeport on the new MSX computers

Briefly

Two new programs from PSS: Bath Time (£7.95) and Les Flics (£6.95), for CBM 64 and 48K Spectrum, respectively. Bath Time is promoted as "true family entertainment, guaranteed to leave you feeling warm and glowing." You must protect a swan and a fish cohabitating in your bath. Keep the water level just right for their comfort — but watch out for the elephant and little boy. Les Flics is a spin-off from the Pink Panther: you must collect items and search for a priceless gemstone, while avoiding the gendarmes.

PSS, 452 Stoney Stanton Rd, Coventry CV6 5DG

Your micro, me Jane

No relation to Tarzan, a new program called Jane is designed to make computer use a bit easier. It uses universally understood symbols and pictures instead of commands and instructions.

The program incorporates the use of a mouse, allowing users to bypass the keyboard except when entering data. The Jane packages, which run on the Commodore 64 and the Apple II family, consist of three applications: a list manager, a spreadsheet and a word processor.

And no, I've no idea why they call it Jane. You can find out for yourself by writing to Arktronics, 113 South Fourth Avenue, Ann Arbor, Michigan 48104 (313) 769-7253

* * *

Dinosaurs is a new educational program to teach pre-schoolers recognition skills needed for matching, sorting, and counting while also getting them used to working with a computer. The same firm has debuted another new program called Lucky's Magic Hat which is an educational program designed to aid in the development of reading, memory, and logical thinking skills. These programs are developed by Advanced Ideas Inc., 2550 Ninth Street, Suite 104, Berkeley, California 94710 (415) 526-9100

* * *

A series of computer games with girls in mind has been brought out by Addison Wesley publishers. In the series there are four games (all non-violent) by Rhiannon. For more information, contact Addison Wesley, General Books Division, Reading, Massachusetts 01867 (167) 944-3700

* * *

The Atari Learning Systems Group has just released AtariLab which converts popular home computers into an electronics lab. The starter set comes with a temperature module, interface, probes, and sensors. The packages (which come in versions to run on Ataris and other computers) help users to learn scientific theories through hands on applications and analysis. Contact Atari Inc., 1265 Borregas Avenue, P.O. Box 417, Sunnyvale, California 94086 (408) 745 5312

* * *

In yet another new product release, Human Engineered Software (HES) has announced a product called Turtle Toyland Jr. Designed for children aged six and up, the program's aim is to make computers and computer concepts easier to understand. At the moment, HES claims to be the largest third-party vendor of software and peripheral devices for the Commodore line. For more information, and a very good catalogue, write HES, 150 North Hill Drive, Brisbane, California 94005 (415) 468-4111.

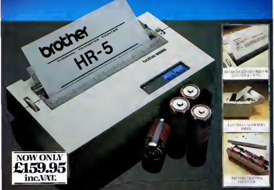
* * *

A new letter quality printer for the Commodore line has just been announced by Cardo. The firm already markets a line of Commodore accessories. Called the LQ/1, the unit has built in connections that will interface with all Commodore computers. It will also work with the IBM PC and PCjr., and other personal computers. The unit features standard friction feed (platen feed for single sheets) and offers optional forms tractor feed, as well as interchangeable daisy wheels. You can contact Cardo Inc. at 313 Mathewson, Wichita, Kansas 67214 (316) 267 3807

That's it for this week. See you next week. Same column, same newsstand!

Bud Izen
Fairfield, California

Little Brothers should be seen but not heard.



A maxim which eloquently describes the Brother HR-5.

Less than a foot across, it's nonetheless loaded with features

The little printer that's low on decibels.

There's one thing the HR-5 won't give you. Earache.

For the annoying 'clickety clack' many printers produce is mercifully absent from the HR 5

Quietly efficient, it delivers high definition dot matrix text over 80 columns at 30 characters per second (maximum).

Text or graphics with ease.

The HR-5 also has something of an artistic bent. Being capable of producing uni-directional graphics and chart images together with bi-directional text. What's more it will hone down characters into a condensed face, or extend them for added emphasis

At home with home computers.

Incorporating either a Centronics parallel or RS-232C interface, the HR-5 is compatible with BBC, Spectrum, Oric, Dragon, Atari and most other home computers and popular software.

Perfectly portable, the battery or mains operated HR-5 weighs less than 4 lbs, and has a starting price of only £159 95 (inc. VAT).

Which is really something to shout about.

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TEL: 061 330 6531 (10 LINES) 061 330 0111 (6 LINES) 061 330 3036 (4 LINES). TELEX 669092. BROTHER INDUSTRIES LTD., NAGOYA, JAPAN

Splatter Bug
by
David Thomas

What could be more homely than a game based on your kitchen sink?

Something tells us David Thomas has been watching too many TV commercials about those invidious germs which lurk in the pipes. In this game you take on the part of Barry Bleach and you must kill 99 per cent of all known germs.

How it works

- **10-99** set up GOSUBs, variables, RUN graphics
- **100-499** draw screen
- **500-1000** main routine
- **1001-1999** fire routine
- **2000-2999** move Berty and drop food
- **3000-3999** spider
- **4000-4999** fire back
- **5000-5999** death, hi score, hi score chart
- **6000-6999** centipede
- **7000-7999** fill sink, random cruise missile
- **8000-8999** start routine, scores, hi score keys
- **9000-9997** graphics
- **9998-9999** save

Berty Bug is a nasty specimen. Not only does he leave food around for you to clear away but he also throws fleas at you! Pristine hygiene is your aim, so you must do away with him.

Variables

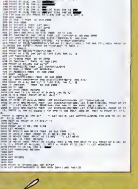
- **A** horiz. position of Barry
- **CE** horiz. position of Cedric
- **MF** horiz. position of Berty
- **Score** lives
- **Hi-score** highest score
- **Tap** amount of times tap can be turned on
- **Caterpillar** whether caterpillar is out
- **Meanie** whether Berty is out
- **Spider** vertical position of spider

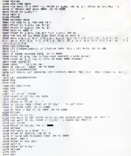
Cedric Centipede is another antagonistic force. He is so intent on destroying you that he seems to have over reacted — he fires cruise missiles at you (surely slightly out of proportion with the size of your battlefield?)

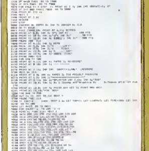
Watch out for these cruise missiles, as they're very unpredictable and can be set off at random. As if all this wasn't enough to wear you out, Sam Spider rises and falls on his thread and he too can bring you to an untimely end.

Your weaponry against this angry mob is bleach blasts, and you must hit your target square on the head. One extra resource you can rely on is turning on the tap to flush them all away down the sink. Go easy, as you can only do this three times.

Listing for Splatter Bug







atch out for epy-crawlies!

Vermin and reptiles are the bane of your life in these two programs for your Spectrum. Annihiliate them or avoid them — they could be your downfall!

Snakes and Ladders by Andrew Bird

You've heard it said that old jokes are the best jokes — well, we think that old games are the best games.

How it works
- **4** set up variables
- **5-200** draw board
- **300-350** draw ladders
- **400-440** draw snakes
- **500-580** set up array of co-ordinates and print numbers in each square
- **600-640** main loop detecting whose go and taking appropriate action
- **700-800** end of game routine
- **1000-1500** player 1's movements and positions
- **2000-2500** player 2's movements and positions
- **3000 3010** switch for dice routine
- **4000-4900** cup shake routine
- **5000 5006** random dice selector
- **7000-7010** up ladder and down snake sound effects
- **8000-8230** introduction and instructions
- **9000-9100** graphics

Here's a game which will be familiar to everyone. Remember playing this with a board, counter and dice? Now you can sit at your Spectrum and play. No dice or counters to lose, no board to reduce to tatters. You can even play against your trusty micro, if your friends aren't at hand.

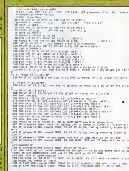
No need to explain the rules since this is such an old favourite. Watch out for the slithery snakes which will make you slide to the depths, and aim for the ladders as they will pave your way to the top.

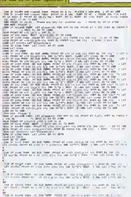
Experience life's ups and down as you play one of those oldies but goldies.

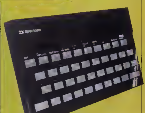
Variables
- **I1,I2** INK colour for printing over counter
- **t,tt** which part of x,y arrays
- **i$** introduction
- **player (1 or 2)** whose go
- **Comp (0 or 1)** detects if computer is playing
- **Dim x, Dim y** array of positions on screen
- **dice** number of moves after dice throw
- **r** computer's random dice selector
- **f,n,w,g** used in loops to set up screen etc

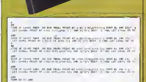
● When typing in Spectrum programs, capital letters in PRINT statements should, unless part of text, be entered in GRAPHICS mode

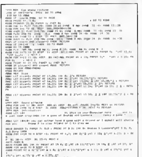
Listing for Snakes and Ladders

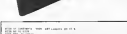












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"The top quality professional product is what I've come to expect from Mikro-Gen"
'Home Computing Weekly'

GENESIS II

✱ the adventure game that understands plain English!

The colony ship Genesis ii has been hijacked by space pirates – and you're the only crewman left! Only you can save the cargo – an entire forest, full of animals, destined to populate a new world. This exciting adventure game has a vocabulary of nearly 300 words, avoiding that frustrating search for the precise word command.

★ Nearly 100 different locations
★ Over 60 objects ★ 100% machine code
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- COURSEWINNER contains a database full of detailed information on all English and Scottish flat courses. The ten leading jockeys and trainers, and effect of the draw is detailed for each course. This information can be displayed on the screen at any time
- The program analyses these factors combined with the results of the last three outings, starting price and weight carried
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SOFTWARE
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POOLSWINNER

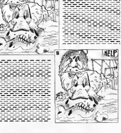
COMPETITION

92 games to win from GEC Dragon

Due to a production error, there were no differences in the GEC Dragon spot the difference competition (HCW 62). We are re-running this competition — and extending the closing date — to give you the chance to win one of 92 prizes of Dragon's fun game, Junior's Revenge, which costs £10.95

Junior's Revenge is a seven-screen game featuring characters like ZuZu birds and the Vinegators. It runs on either Dragon.

Study the two cartoons and circle the differences on cartoon B. Seal the cartoon and coupon in an envelope, writing the number of differences you found on the back of the envelope. Post your entry to GEC Dragon Competition, Home Computing Weekly, No 1 Golden Square, London W1R 3AB. Entries close at first post on Friday June 15, 1984. Please study the How to Enter and Rules sections of the Elephant spot the difference competition in this issue of HCW: these guidelines also apply for this competition.



GEC Dragon Competition

Entry Coupon

Name ____________________

Address ____________________

__________ post code __________

Number of differences found __________

Complete clearly and fully — if you are a winner this will act as a label for your prize. Post to GEC Dragon Competition, Home Computing Weekly, No 1 Golden Square, London W1R 3AB. Closing date: first post Friday June 15, 1984. Do not forget to write the number of differences on the back of your envelope

A Penny For Your Thoughts

Actually MicroQuest offers you rather more than a penny.

£1 000 to be precise, if you can come up with an idea for an innovative and original use of microelectronics.

MicroQuest is organised jointly by Williams & Glyn's Bank and MAP the Department of Trade and Industry's programme to encourage the application of microelectronics. The competition aims to encourage young people to take an active part in the development of British industry and business.

WHO CAN ENTER?

MicroQuest is open to everyone between the ages of 16 and 21, and is divided into two categories. The first is a general category allowing entries from anyone between 16 and 21, and the second dealing with those over 16 in secondary education.

We require entrants to MicroQuest, to submit a 2 500 word report, identifying a new use for microelectronics and explaining how it could be implemented.

The applications can be literally for anything from musical instruments to control systems for mining machinery. The idea of the competition is to produce applications that will improve and develop original products or processes. It is important, however, that you keep in mind that the applications must be practical and therefore realistic in terms of cost.

The report itself should give us a clear description of the area where you see the application being made and what will be the benefits of the application. If you wish to illustrate your report make sure that all your designs/illustrations are on A4 paper and that there are no more than 6 of them. When you send in your report it should include a summary of about 300 words of its contents.

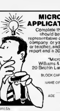
The prizes for the general category will be a first prize of £1 000, with runners up receiving prizes of £500 and £250. The schools category will have a first prize for the winner's school of £500 of computer equipment of its own choice, plus a cash prize of £150 for the winner. The runners-up will receive £100 and £50.

HOW TO ENTER

Simply tear off and complete the attached entry form and submit it with your report, which should also include a 300 word summary and any designs you have produced. The completed application form should be signed by your employer, teacher or supervisor.

Send the completed form to "MicroQuest", Williams & Glyn's Bank, 20 Birchin Lane, London EC3.

But hurry. Entries for the competition close on the 30th June 1984.



MICROQUEST APPLICATION FORM

Complete this form, which should be signed by a representative of your employers company, or your training officer or teacher, and send it with your report and a 300 word summary to

"MicroQuest",
Williams & Glyn's Bank,
20 Birchin Lane, London EC3

BLOCK CAPITALS PLEASE

NAME OF APPLICANT

AGE

DATE OF BIRTH

ADDRESS

NAME OF COMPANY/COLLEGE

NATURE OF COMPANY BUSINESS (if applicable)

SIGNATURE OF ENTRANT

I, the undersigned, confirm that this application is supported by (Name of Company or Training Supervisor)

SIGNATURE

POSITION IN COMPANY/COLLEGE

HCW64

Texas
Strikes Hard!
Christine

Oric 1 and Oric Atmos

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"**100% machine code** makes this game fast, exciting (includes special effects otherwise impossible to imitate)

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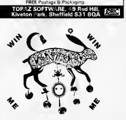


What's new, Aunty Beeb?

A wide range of programs for the BBC has been thoroughly scrutinised for you by our panel

Maths
32K BBC/ Electron £9.50

Sensoft, 5 Minster Gardens,
Newthorpe, Nottingham NG16
1AT

I'm afraid this is not the sort of educational program I can fully recommend as I cannot see what need it is meant to fulfil.

The tape comprises five programs all aimed at the nine thirteen age range which seems about right.

In Lemonade you are a lemonade seller and decide how much lemonade to make in anticipation of the day's sales and depending on the weather. There is little if any maths in this program if you always choose to make less lemonade than the money you have available — so, rather pointless.

Angle is an estimation program which shows an angle always in one orientation and is less than inspiring.

Glass is a wire frame drawing program in which you set up a cross sectional design and then the computer draws a 3D model of it, again, where's the real maths? I ask.

Percentage involves estimation of the shading on a 100 square grid and Hanoi is a very old logic game.

All told very pedestrian with no sound or real value. **D C**

instructions	60%
ease of use	60%
graphics	45%
value for money	20%

★

Demolator
32K BBC £6.95

Visions, 1 Felgate Mews,
Studland St, London W6

As a marketing exercise this game is only available through one high street store at the moment. I advise you to see it soon.

You are the only robot left after a particularly nasty 1000-year war and you are trying to protect the last of the human race in cryogenic suspension, from the nasties who have invaded your ship. There are 24 different screens so there is plenty of action. The comparison I can make is to a cross between a road race game and a space shooting game.

The action is particularly fast, as is the animation, yet there is little flicker and eye strain. The cassette card contains a full explanation of the nasties and the title program is interrupt driven so that you can define the keys and read the instructions whilst the second part loads, other companies please note!

A great idea is a practice game on the second side which allows you infinite lives so that you can try every screen. **D C**

instructions	85%
playability	100%
graphics	90%
value for money	95%

★ ★ ★ ★ ★

Flint's Gold
32K BBC £6.95

Micrograf, PO Box 17, Bracknell, Berks RG12 3NQ

You are a humble labourer who has worked on a farm all his life. Suddenly you reject your way of life, and become a fierce swashbuckler. You set out for the nearby port in search of adventure. Here you hear stories of the legendary Flint's Gold and you resolve to search for this mysterious treasure. It is at this point that you start the adventure, communicating with the computer by means of two word sentences.

The game is written in Mode 7 and includes low resolution screen pictures from time to time. One of the most outstanding features of the game is the amazing sound effects, the best is the sound of waves hurling pebbles as they break, accompanied by the crying of seagulls.

While the game is loading a sea shanty is played, fading slowly as the loading finishes. The sound effects and music are something else but the game is not remarkable. After taking so long to load I expected more. This one is just a little too difficult. **M B**

instructions	60%
playability	40%
graphics	60%
value for money	50%

★ ★

Identikit
32K BBC £7.95

Stell, 36 Limefield Avenue,
Whalley, Lancs BB6 9RJ

The aim of this 'game' is to build up a face using the various shaped features you are allowed to select and then modify the face as you wish. I suppose this program could be used in schools as an introduction to observational skills or in the middle of a police project but after that I'm stumped as to what purpose it is meant to serve. To give the publishers their due they do only claim that it is "an entertaining introduction to the computer for children aged 2-8." But surely there are other, more educational, introductory programs available even for such young children?

The program is very easy to use everything being menu driven and using only two keys. An innovation is the movement routine which allows you to wiggle ears or nose, blink eyes, frown or smile but the interest of my five year old waned after only two faces. For the older ones however there is a 'Kim's game' option where you have to reconstruct a face from memory.

A strange educational offering of dubious value. **D C**

instructions	70%
playability	90%
graphics	75%
value for money	30%

★ ★

Vampire Castle
32K BBC £6.95

Micrograf, PO Box 17, Bracknell, Berks RG12 3NQ

In this terrifying adventure you live in a small village among peace loving simple country folk. When cattle are brutally slaughtered, a villager mysteriously disappears, and others are woken by eerie organ music and blood curdling screams in the middle of the night, you are volunteered to seek out and destroy the culpable Drac.

Two word instructions and directions enable you to enter and explore the nearby castle. Remember, one false move and you're just another body for Drac to get his teeth into.

The game includes Mode 7 graphics and plays a tune while loading.

Adequate instructions are given inside the cover, and more appear after loading. The instructions set the scenario well but I would have preferred a more detailed list of usable verbs.

The game does include a 'save present position' option, standard in most adventures. This saves a lot of unnecessary typing the next time you play.

Overall it is not too difficult. Who knows, eventually you might get to meet Dracula. **M B**

instructions	60%
playability	60%
graphics	60%
value for money	70%

★ ★ ★

Over £1,000-worth of prizes! Win four great games from Elephant Software

ENTER our spot the difference competition and you could win not one but four games from Elephant Software. Elephant is giving away prizes worth more than £1,000 — each tape costs £6-£7, so the total value of each prize is nearly £26

The four games you can win are Paragram, Vanquisher, Ringo and Jerico 2 for the 48K Oric 1 The first three are similar in style games of manipulation requiring logical thought

In **Paragram** you must rearrange 16 random letters on a grid to alphabetical order As you move one you dislodge three others **Ringo** is a similar idea with coloured beads in two intersecting rings You must shuffle them round to form blocks of colour In **Vanquisher** you must make up the word Vanquisher from the letters arranged on a top siding in a railway station You can shunt them using the tracks and siding None of these games are ever the same as the order of letters or beads is random

Jerico is different Joshua has laid siege to the city of Jerico to regain the lost H Use rocks and food as ammunition, build ladders, use battering rams siege towers and ballistas and make tunnels under the walls

Elephant's aim is to make you use your brain and your micro to full advantage, as well as give you hours of fun Director Dennis Wieckowski said "Not everyone who owns a computer is 10 to 15 years old and mad on arcade games Space Invaders isn t my cup of tea At Elephant we fill the gap between Hobbit-type games and space invaders Our games are the kind where you sit down with a cup of tea and a couple of sandwiches, not manic finger-twitching games

"We like to encourage programmers, so all our programs are written in BASIC We are keen that users should take them apart to study them and learn what they can and then modify them

"We distribute through three major wholesalers and by mail order" he continued "The business was started up about a year ago and we aim to bring more thinking games to the software market We also do the same range for the Spectrum with an additional game, Cosmic Pirate, which has 3D graphics and a bit of finger twitching

"Our Oric games are only compatible with the 48K Oric 1 and not the Atmos" Mr Wieckowski said "However, you can easily convert them to the Atmos by changing the TAB instructions"

How to enter

Study the two cartoons — there are a number of differences between them Circle the differences on cartoon B and seal the cartoon and coupon in an envelope Write clearly on the back of the envelope the number of differences you found

Post your entry to Elephant Competition, Home Computing Weekly, No 1 Golden Square, London W1R 3AB Entries close at first post on Friday June 15 1984

You may enter as many times as you wish but each entry must be on the official coupon — not a copy — and sealed in a separate envelope

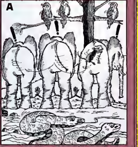
The winners will be the senders of the first 40 correct entries opened at random after the closing date

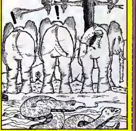
The prizes will arrive from Elephant within 28 days of the publication of the issue containing the names of the winners or earlier

Important please follow carefully the guidelines for entering — incomplete coupons and entries in envelopes without a number on the back cannot be considered If you are a winner the coupon will be used as a label to send your prize so clear writing is essential

The rules

Entries will not be accepted from employees of Argus Specialist Publications Elephant and Alabaster Passmore & Sons This restriction also applies to employees' families and agents of the companies The How to Enter section is part of the rules





Elephant Competition

Entry Coupon

Name ____________________

Address ____________________

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Number of differences found __________

Complete clearly and fully — if you are a winner this will act as a label for your prize Post to Elephant Competition, Home Computing Weekly, No 1 Golden Square, London W1R 3AB Closing date: first post, Friday June 15 1984 Do not forget to write the number of differences on the back of your envelope

Now your duck for rev

Duck Shoot

Living a duck's life is worse than living a dog's life, for not only do you have to put up with having a wet bottom for three quarters of the time, but the nasty humans are trying to shoot you too.

In this game we take pity on the duck, who never actually gets killed, and even has the chance to get his own back on the evil hunter.

The aim of the game is to shoot as many ducks as possible with the 10 cartridges you have left. Our hero, the duck, is in the meantime trying to drop his ammunition on you. If he succeeds then your gun becomes useless, so you must go off to repair it.

Hints on Conversion

We have made the structure of the game as simple as possible so that conversion for other machines should be easy if you follow the plan below

- All the PROCedures can be changed to sub routines and called with GOSUBs
- Replace REPEAT/UNTIL loops with GOTOs or IF xxxx THEN GOTO
- The screen format is 20 x 32 with up to 16 colours
- The Electron has one sound and one effect channel

In order to give the duck a better chance of survival you are not allowed to move your gun to the edge of the screen and ambush him. Whenever he flies off one edge your gun reverts to the centre of the screen and you must take aim again.

This duck is not stupid either. He flies across the moor at several different heights. If by any sad chance you do actually hit him, he plummets to the ground completely demolishing your gun. At this stage the dog mentioned above comes running on to collect the fallen duck.

But all is not lost — the duck is only winged and winded and the barking of the dog revives him sufficiently to allow him to make his escape and fly again another day.

The program was written by 10 year old Robert and his father, neither of whom have had any programming training except from the local BBC user group. In fact the whole project was started one club night, during a session on how to write a game from scratch.

```
00 REM Duck Shoot / R & J Moss
10 ON ERROR GOTO 10000
20 PROCinit
30 REPEAT
40 PROCrun
50 MODE 4
60 PROCinstruct
70 MODE 2
80 VDU 23,1,0;0;0;0;
90 COLOUR 132
100 CLS
110 REPEAT
120 COLOUR 3
130 PRINT TAB(duckx%,ducky%);duck$;wipe$
140 COLOUR 0
150 PRINT TAB(gunx%,28);gun$;wipe$
160 COLOUR 7
170 PRINT TAB(duckx%,ducky%);duck2$;wipe$
180 COLOUR 2
190 PRINT TAB(0,1);"SCORE=";score;" SHOTS=";shots;"
200 COLOUR 13
210 PRINT TAB(0,30),"High-score=";high
220 duckx% = duckx%-1
230 PROCkey
240 IF duckx% = RND(18) OR duckx% = 7 THEN PROCdrop
250 IF duckx% = 0 THEN PROCreset
260 UNTIL endflag = TRUE
270 UNTIL FALSE
280 :
290 DEF PROCkey
300 IF INKEY(-99) THEN PROCfire
310 IF INKEY(-98) THEN PROCleft
320 IF INKEY(-67) THEN PROCright
330 IF INKEY(-52) THEN RUN
340 COLOUR 0
350 PRINT TAB(gunx%,28);gun$;wipe$
360 ENDPROC
370 DEF PROCleft
380 gunx% = gunx%-1
390 IF gunx%<0 THEN gunx% = 0
400 SOUND 1,-15,200,3
410 ENDPROC
420 DEF PROCright
430 gunx% = gunx%+1
440 IF gunx7>18 THEN gunx% = 18
450 SOUND 1,-15,200,3
460 ENDPROC
470 :
480 DEF PROCfire
490 COLOUR 7
```

The program was written on an Electron (Yes they do exist!) and because of this it will run quite happily on a BBC too.

The only problem is that the extra speed of the BBC means some of the animation is not as effective as on the Electron. Therefore there are some BBC modifications detailed below.

The program has no REMarks in order to save memory and to make things as fast as possible but the PROCedure names are supposed to be self explanatory and should help you follow what is happening.

The most interesting technique, for those not familiar with the sound facilities is the simulation of interrupt driven playing routines.

PROCnote itself is simple enough, it READ's the music DATA from the statements on lines 1440-1460 and plays the

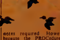
has a chance
enge...

```
500 SOUND 0,-15,20,2
510 FOR counter% = 26 TO ducky% STEP -1
520 PRINT TAB(gunx%+1,counter%);"."
530 PRINT TAB(gunx%+1,counter%);" "
540 NEXT
```

Main variables

counter%	multipurpose loop variable
duckx%	duck x co-ordinate
ducky%	duck y co-ordinate
duck$	first duck
duck2$	second duck
dog1$	first dog
dog2$	second dog
endflag	flag variable which detects end of game state
gunx%	gun x co-ordinate
gun$	actual gun shape
high	highest score today
pitch%	note to play
score	score this game
shots	number of shots left
time1%	duration of note being played
time2%	duration of inter note gap
wipe$	used to wipe out duck between moves

```
 550 IF gunx% = duckx% THEN PROChit
 560 IF shots = 0 THEN PROCshots
 570 shots = shots-1
 580 ENDPROC
 590 :
 600 DEF PROChit
 610 shots = shots+1
 620 score = score+1
 630 PROCfall
 640 IF score>high THEN high = score
 650 PRINT TAB(10,10);"HIT"
 660 TIME = 0
 670 REPEAT UNTIL TIME = 50
 680 PRINT TAB(10,10);"   "
 690 PROCdog
 700 CLS
 710 duckx% = 19
 720 gunx% = 7
 730 ENDPROC
 740 :
 750 DEF PROCreset
 760 CLS
 770 duckx% = 19
 780 ducky% = RND(16)+2
 800 ENDPROC
 810 :
 820 DEF PROCfall
 830 pitch% = 200
 840 COLOUR 3
 850 FOR counter% = ducky%+2 TO 27
 860 SOUND 1,-15,pitch%,1
 870 PRINT TAB(duckx%+1,counter%);duck$
 880 PRINT TAB(duckx%+1,counter%);" "; TAB(duckx%,counter%-1);"  "
 890 pitch% = pitch%-4
 900 NEXT counter%
 910 PRINT TAB(duckx%+1,28);duck$
 920 ENDPROC
 930 :
 940 DEF PROCinstruct
 950 VDU 19,7,4,0;0;0;
 960 VDU 19,0,3,0;0;0;
 970 PRINT TAB(13,1);"Duck Shoot"
 980 PRINT TAB(13,2);"----------"
 990 PRINT TAB(8,4);"By Robert & John Moss"
1000 PRINT TAB(0,7);"        The keys are:
Z.............LEFT                      X.............RIGHT
     SPACE.........FIRE                        R.............RESTART
GAME"
1010 PRINT
1020 PRINT "  P.S.  WATCH OUT FOR BIRD DROPPINGS !"
1030 PRINT
1040 PRINT "       PRESS SPACE TO START GAME"
1050 REPEAT
1060 PROCnote
1070 UNTIL INKEY(-99)
1080 ENDPROC
1090 END
1100 :
1110 DEF PROCshots
1120 COLOUR 1
1130 COLOUR 135
1140 PRINT TAB(0,10);"YOU RAN OUT OF SHOTS !!!!!!!!!!!!!!!!!!"
1150 TIME = 0
1160 REPEAT UNTIL TIME >200
1170 endflag = TRUE
1180 ENDPROC
1190 :
```



notes required. However, because the PROCedure is called from within a REPEAT-UNTIL loop we can check for your being ready to play the game using the negative INKEY statement (for those unfamiliar with BBC BASIC this tests for a particular key being pressed only at the instant the statement is executed) and then stop the music to play the game.

It is possible to have the music playing throughout the game but we found this to be annoying.

There are two initialisation routines setting variables, one for the whole program (init) and one which resets everything before each new game or sheet (run).

By defining two ducks (duck$ and duck2$) we can give the impression that the duck is flapping its wings. All that is required is to print one on top of the other quickly enough and you have your flaps.

Dont type line 10 until you are sure you have a fully debugged version of the program.

BBC users change the number on lines 1540,1570 to 30. Add lines 525 and 1235 both saying TIME = 0: REPEAT UNTIL TIME > 5. There is no reason why you cannot change any of these values to suit yourself.

How it works
PROCedures

PROCinit	set up all the variables which are needed throughout the program
PROCrun	set up those variables which are needed for each new attempt
PROCinstruct	prints instructions on screen, plays tune and waits for space bar to be pressed
PROCkey	checks for keys being pressed and acts accordingly
PROCdrop	deposits the bird's revenge
PROCreset	sets duck up into a new position for each run across the screen
PROCfire	guess what this does!
PROCleft	moves gun left
PROCright	moves gun right
PROChit	checks to see if duck is hurt and then reacts
PROCshots	prints out of ammo message
PROCfall	shows duck falling to earth
PROCdog	the retriever routine
PROCnote	plays a single note
PROCchars	defines characters
PROCstrings	sets up actual strings to be printed

```
1200 DEF PROCdrop
1210 FOR counter% = ducky%+2 TO 28
1220 COLOUR 7
1230 PRINT TAB(duckx%+1,counter%);","
1240 PRINT TAB(duckx%+1,counter%);" "
1250 NEXT
1260 IF gunx%<>duckx% THEN ENDPROC
1270 COLOUR 7
1280 PRINT TAB(gunx%+1,27); CHR$(130)
1290 COLOUR 0
1300 PRINT TAB(gunx%+1,28); CHR$(131)
1310 COLOUR 7
1320 PRINT TAB(0,10);"         PLOP!"
1330 SOUND 1,-15,150,3
1340 TIME = 0
1350 REPEAT UNTIL TIME >200
1360 RESTORE
1370 endflag = TRUE
1380 ENDPROC
1390 DEF PROCnote
1400 READ pitch%,time1%,time2%
1410 IF pitch% = 0 AND time1% = 0 AND time2% = 0 THEN RESTORE
1420 SOUND 1,-15,pitch%,time1%
1430 SOUND 1,0,1,time2%
1440 DATA
100,10,3,96,5,3,100,10,3,88,5,3,92,3,3,92,5,3,88,3,3,92,5,3,100,5,3,88
,10,10,100,10,3,96,5,3,100,10,3,88,5,3,92,3,3,92,5,3,88,3,3,92,5,3,100
,5,3,88,10,10
1450 DATA
60,5,3,60,3,2,80,5,2,92,3,3,108,5,3,52,5,3,52,3,2,72,5,2,88,3,3,100,5,
3,52,5,3,52,3,2,68,5,2,80,3,3,92,5,3,52,5,3,52,3,2,72,5,2,88,3,3,100,5
,3,60,5,3,60,3,2,80,5,2,92,3,3,108,5,3,52,5,3,52,3,2,72,5,2,88,3,3,100
,5,10,52,3,3,52,3,3
1460 DATA 92,5,2,88,3,3,80,5,3,72,10,10,0,0,0
1470 ENDPROC
1480 :
1490 DEF PROCdog
1500 COLOUR 7
1510 FOR counter% = 19 TO duckx%+2 STEP -1
1520 PRINT TAB(counter%,28);dog1$
1530 TIME = 0
1540 REPEAT UNTIL TIME >5
1550 PRINT TAB(counter%-1,28);dog2$
1560 TIME = 0
1570 REPEAT UNTIL TIME >5
1580 NEXT
1590 ENVELOPE 4,1,1,1,1,1,100,100,100,0,0,-126,126,126
1600 SOUND 1,4,100,12
1610 PRINT TAB(0,29);"                    "
1620 COLOUR 2
1630 PRINT TAB(0,1);"SCORE=";score
1640 FOR counter% = duckx%-1 TO 1 STEP -1
1650 COLOUR 3
1660 PRINT TAB(counter%,26);duck$
1670 COLOUR 7
1680 PRINT TAB(counter%+2,28);dog1$
1690 TIME = 0
1700 REPEAT UNTIL TIME >10
1710 COLOUR 3
1720 PRINT TAB(counter%-1,26);duck2$
1730 COLOUR 7
1740 PRINT TAB(counter%+1,28);dog2$
1750 TIME = 0
1760 REPEAT UNTIL TIME >10
1770 NEXT
1780 ENDPROC
1790 DEF PROCchars
1800 VDU 23,133,0,35,66,254,252,36,66,129
1810 VDU 23,134,2,66,66,254,252,36,24,16
1820 VDU 23,128,0,0,0,3,6,14,94,252
1830 VDU 23,129,127,60,24,0,0,0,0,0
1840 VDU 23,130,32,32,32,32,48,48,56,52
1850 VDU 23,131,60,52,24,44,14,14,6,2
1860 VDU 23,132,0,0,0,0,0,0,64,252
1870 ENDPROC
1880 DEF PROCstrings
1890 duck2$ = CHR$132+ CHR$32+ CHR$10+ CHR$8+ CHR$8+ CHR$129+ CHR$32
1900 duck$ = CHR$128+ CHR$32+ CHR$10+ CHR$8+ CHR$8+ CHR$129+ CHR$32
1910 wipe$ = CHR$32+ CHR$11+ CHR$8+ CHR$32
1920 gun$ = wipe$+ CHR$130+ CHR$10+ CHR$8+ CHR$131+wipe$
1930 dog1$ = CHR$(133)+ CHR$(32)
```

```
 1940 dog2$ = CHR$134+ CHR$32
 1950 ENDPROC
 1960 DEF PROCinit
 1970 high = 0
 1980 PROCchars
 1990 PROCstrings
 2000 ENDPROC
 2010 DEF PROCrun
 2020 shots = 10

 2030 score = 0
 2040 ducky% = RND(16)+2
 2050 duckx% = 19
 2060 gunx% = 7
 2070 endflag = FALSE
 2080 ENDPROC
10000 IF ERR<>17 THEN GOTO 20
10010 MODE 6
10020 REPORT
10030 PRINT " in line ";
10040 PRINT ERL
10050 END
```

Life as a duck used to be pretty rotten, until father and son team Robert and John Moss came up with their program. Type it in and see — it works on the Electron and the BBC micro

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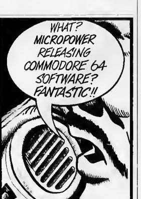

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BBC users' guide

How to use the guide

There is no doubt that the BBC computer was made to be extended, which it can be in almost any direction It has so many different interfaces that it would be easy to dwarf the computer with add-ons The difference between BBC add-ons and those for other computers is that, since the BBC is designed to be extended the BASIC and machine operating system can control add-ons with the minimum inconvenience for the user

This survey aims to help you choose add-ons for your system, the range available is vast You can attach real time clocks, digitizers, disc drives and almost every other piece of computer equipment invented, including the unique BBC buggy

All the items mentioned have a rating These are personal and subjective, based upon my experience These ratings should help you make your choices The ratings are in two groups those based on actual hands-on experience and testing (shown by an H) and those based on the manufacturer's information (shown by L for leaflet) Ratings should not be directly compared between these two categories When you are about to buy one of these products I would advise you to read the review noting the source of information, and then if possible try the product out at a local dealers or an exhibition I would caution against mail order on some of the more expensive items Even during the preparation of this supplement promises of delivery were made which never materialised!

Each type of add-on is introduced and its main features analysed, followed by a detailed description of the various types available

Prices given were correct at time of writing, so please check if you think there could have been any change All include VAT, and postage and packing if appropriate

If you manufacture a product which you would like to be reviewed for the next issue of the supplement then please get in touch with HCW as soon as possible and we will do our best to include it

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Disc Drives and Interfaces

Prices are for a single sided drive unit with 40 tracks (100K) and for a double-sided, double drive unit with 80 tracks (800K) unless otherwise stated

Acorn disc drives
check with local suppliers

It is easy to assume that the computer's manufacturer also supplies the best disc drive I'm afraid this is not the case here I originally owned one of these drives and was less than satisfied with it

Acorn's disc drives are supplied in two styles only a single-sided, single drive 40 track and a double sided, double drive 80 track This means there is not only restricted choice but there is no opportunity to upgrade either

This is quite unsatisfactory, as I'm sure Acorn have found to their cost and to the gain of the independent suppliers

The drives are all full height and therefore take up a great deal of space The reason for my dissatisfaction is their unreliability and the way in which they go out of alignment so easily This is worrying under any circumstances but can be fatal if you are working on important discs

I cannot really recommend these drives

value for money 30%
L ★

Alpha Disc drives
£144 90/£533 80

Alpha Disc's drives now come in two distinct forms, both made by Canon but differing in size and characteristics to some extent The prices given above are for the MDD drive which are two-third height and can be purchased in any combination you wish, including an upgradable drive in a dual case ready for the second drive to slot in

The drives also come with or without power supplies in the single drive range although the dual drives come only with a power supply

To all extents and purposes these are the same drives as the PACE ones reviewed below and although they are in different cases, I think my previous comments should also apply here

The new species of drive have some interesting specifications they are the new Canon one-third height MDD 221 models, which Alpha Disc modifies in two ways Firstly they add in a secondary LED controller board, which not only shows which drive is working and, by colour, in which track mode it is working (40 = green, 80 = red), but also if the power is switched on or not The second enhancement is the new secondary switching power supply which runs so coolly that no ventilation holes are required

As the price of these drives seems to be the same as for the old style I would suggest they are worth investigating

value for money 85%
L ★ ★ ★ ★ ★

AMS three-inch disc drives
£225/£399

This company was the first on the market with the new three inch drives for the BBC AMS only supplies two configurations a single sided single drive unit 40 tracks, and a double drive unit to the same specification The reason is quite simple The discs are double sided but are meant to be removed and turned over

The discs are also well protected against any possible damage, something for which the normal floppy disc is most unprepared There is a hard plastic case and a steel shutter which automatically moves into place when the disc is taken out of the drive

The units are supplied with manual and disc utilities both on a disc and in an EPROM This is an excellent idea as it means discs can be formatted without damaging the contents of memory and without having to insert another disc into the drive containing the formatting program

Their small size and robustness make these ideal for those applications where physical damage is possible and I would expect them to have a good future in education when more software becomes available in this format

Blank discs are a little more expensive and more difficult to find than ordinary floppies but this could change rapidly as demand grows

value for money 70%
L ★ ★ ★

Cumana disc drives
£194 35/£539 35

Cumana is another company which has been supplying drives for the whole of the BBC DFS's life. Cumana is a company with a high reputation for quality, reliability and delivery Its range is now one of the most comprehensive available Not only does Cumana do the full range of single/double drives, single-/double sided and 40/80 track but also units with and without a separate power supply

The argument is made that the BBC power supply unit is not powerful enough to run the double drive units and so they require a separate power supply in order to get the power they require I cannot really comment on the argument except to say that I have been running my (PACE) double drives off the BBC's power supply for well over a year now without any trouble at all The drives with the power supply built in have their own mains cable with moulded plug and a neon indicator power switch

Cumana also supplies switchable 40/80 track drives at £64 40 above the price given This is not such a good idea as it is likely to encourage people to switch between modes while the drives are powered, which can then lead to data errors

This is the only company so far to package and market their drive for the high street stores, such as W H Smith and the Spectrum shops For this reason they may be easier to obtain

value for money 75%
L ★ ★ ★ ★

LVL disc drives
check with your local dealer or LVL for price

LVL supplies not only these drives but also a double density controller which can be used with them I haven't yet seen the controller but the drives are very similar to the others reviewed here

They are supplied in colour matched cases and are generally two-third height They come complete with all leads, manual and a utility disc There is an upgradable model which comes fitted with a blanking plate in the place of the second drive The standard drives are powered from the BBC but LVL also makes a version with a power supply However, LVL doesn't seem to produce a switchable 40/80 track disc drive as so many manufacturers do

Not enough information for a rating

Mail Order Micros disc drives
£209 30/£571 55

This company also markets a full range of drives and the double drives can be supplied with or without their own power supply It also offers the choice of stacked or flat units on the models with power supplies built in

What is unusual is that the company supplies its drives with detachable cables both power and data this could be of interest to those who use

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[illegible]

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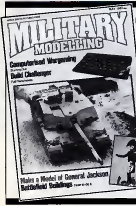
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more than one micro and can make up appropriate cables for the second. I would like this feature as my machine visits user groups and cable unthreading is a chore.

The drives in these units are all made by TEAC and as an extra the company supplies the instruction manual for the drive units — a feature I wish others would follow as it makes servicing easier. Unfortunately there is no mention of DFS manuals or utility discs being included in these prices, so please check availability as you cannot use a drive without them.

value for money 70%

L ★ ★ ★ ★

Microware disc drives

£228.85/£511.75

Microware supplies a vast range of drives but please don't think their prices seem too expensive when compared to the others given. The company doesn't produce a single sided drive at all so the price given above is for their 200K single drive, double-sided and 40 track.

These drives, like most of the others, are supplied in the BBC colour matched metal cases, some of which also have a power supply unit. The company only produces half height drives and the double drive units are usually stacked. The double units with a power supply have a large area under the drives which is, to my eye, rather unattractive.

One feature to note is that this company markets an expandable drive unit which you buy with only one drive in place but which can become a double system at a later date by the purchase of another 'bare' drive unit.

Microware also produces one of the few BBC double density disc controllers which offer twice as much data on the same size disc, i.e. up to 1.6 megabytes on the 80 track, double sided, double drive unit. It also claims to be faster than the Acorn DFS and to offer some compatibility with discs written on the standard DFS. This is the real test of such a system though, for if you cannot buy software which will work on your controller then the only use for such a system is to develop your own software, a situation many people would like to avoid.

value for money 70%

L ★ ★ ★

MW Systems disc drives

£194.35/£470.35

This company also supplies its higher capacity drives with 40/80 track switching capability, it doesn't supply a purely 80 track drive at all. The interesting thing about the design is that they are meant to go under the BBC computer.

The case is the full width and length of the BBC. This means that there is a much wider gap between the drives than in the normal drive system.

One of the features is the ability to upgrade from single to dual drive by simply purchasing a bare drive unit to plug into the case you already own. However I would expect some people to prefer this to be done by an engineer. The lower price given above is not for the upgradable pack, however (400K is the lowest capacity at a price of £279.45), it is for the new 200K drive from Epsom which MW Systems also supplies.

This unit is attractively styled but not supplied as a double drive, as the singles can be connected together and then run as dual systems. All the prices include leads, manual and utility discs.

value for money 90%

L ★ ★ ★ ★

Opus disc drives

£179.95/£599.95

The range of Opus disc drives includes 3 inch microdrives and both single and double drive 5¼ inch Japanese disc drives.

Prices range from £179.95 for a single sided 40 track drive to a double sided double drive (80 track, 800K) with 1.6 megabyte on line at £599.95.

According to Opus, the 3 inch microdrives have twice the capacity on line of other available drives and use the lowest power consumption, because of their direct drive. They have an access time of 3 ms and are totally compatible with 5¼ inch drives. Price includes case, leads and utilities disc.

The 5¼ inch single drives are half height, and again the price includes case, leads and utilities disc. All dual drives are metal cased with a separate power supply.

E.G.

PACE disc drives

£203.25/£465

This company has been supplying disc drives for almost as long as the BBC disc interface has been available. It has an excellent reputation for both service and reliability. The drives are all supplied with a metal case in the BBC colour, complete with cables, manual and utility disc. The drives are available in two styles, half height and the very neat new one-third height models. They all cost the same price so you need to consider the space you have available before purchase and buy the style to suit you.

I have had experience of both styles and they are equally reliable and fast in operation. They are so fast that the BBC's keyboard links can be made to inform the DFS of the speed available and so utilise it to the fullest extent. To say that the drives are reliable is almost too weak a statement: in more than one year's full and heavy use I have only had a few disc read/write errors, most of which can be attributed to my playing 'dirty tricks' on the discs.

The only part of the package that is not fully up to the mark is the manual, which is less informative than Acorn's. This is not really a problem if you simply intend to use the discs for program storage but the sections on random access filing and the use of files in assembler could have been more comprehensive. Also, as in common with most manuals, the various DFS error messages are simply skipped over.

The utility disc has a very fast formatting program and has the novel feature of being able to be read by both 40 and 80 track drives. This feature is essential for the dual system 40/80 track drives which incorporate a switch to change systems and give you the flexibility to choose between large capacity or software compatibility.

value for money 80%

H ★ ★ ★ ★

Acorn DFS and interface

£97

This was the first disc interface available and, being the manufacturer's own system, is the one with which most of the software is compatible. It resides on an EPROM which, when fitted inside the machine, gives a new range of commands for the disc filing system.

The firmware works well and is fairly fast but there are some glaring omissions and downright mistakes. One of the omissions is the formatting routine, which you need in order to organise your blank discs before you can record files or programs on to them.

Acorn only supplies this free with its own drives (or at a cost of £30) which is very mean indeed and seems to be aimed at protectionism rather than customer service. The utility disc is essential, as is a decent manual which is also given away with their drive or included in the £30 extra charge. The disc interface is otherwise reasonably reliable and all the commands are simple yet fairly powerful.

The few bugs I have discovered are in the sequential filing system where strange things can happen if your file length is not a multiple of whole sectors. The strange things involve some of your data being lost, so always save some extra data as an insurance against this. This system has set a fairly high standard for the products which follow but has room for improvement.

value for money 80%

H ★ ★ ★ ★

PACE/Amcom DFS and interface

£95

This interface tries to emulate the Acorn system while adding to it in many ways. One real advantage is that the formatting program is inside the chip and therefore always available, without losing the contents of memory. The other main feature is the ability to have 63 files on a disc instead of Acorn's limit of 31. This limit is due to the way that catalogue information is stored on the first track. The Amcom 'SYS1' discs use a different method of catalogue storage which, while using more space, does allow longer names of up to 15 letters (Acorn's limit: seven) and more files to the disc.

The number of files available on each disc is not of vast importance if you create large files or programs, but if you wish to store short items, e.g. from a word processor like letters, it is very frustrating to find the catalogue is full if you still have over half the disc surface left empty.

The problems with this DFS are mainly to do with speed and compatibility. The early releases of the filing system were very slow indeed but this has been largely solved now and some of the random access filing commands prove faster than using Acorn's DFS. The system is slower each time you insert a different disc, due to the fact that it first checks to see which format of disc you are using and then reads the catalogue properly for that disc.

There are very few areas where the DFS is not fully compatible with the Acorn one but if you use coloured titles on your discs you will have difficulties. The excellent utility disc and manual supplied with the DFS can solve this problem though, besides containing many other useful programs like screen dumps for Epson and NEC printers.

This is a good filing system for those who need its extra facilities and are buying their first disc drive but I would not recommend those who already have the Acorn DFS to change over to this system.

value for money 82%

H ★ ★ ★ ★

Sideways ROMs and ROM boards

Beebugsoft Exmon

£27 non members, £16.50 members

This is another good ROM which is used by many machine code programmers for all their development work. I have used the routines only rarely but they do offer an insight into the operation of the machine if you think machine code is double dutch.

The routines are used from a front panel display and, as this is a language ROM, if you press **BREAK** you return to that display. The panel displays all the registers of the 6502 central processor unit and a dump of part of memory. This can be changed to any area and the registers can be seeded with any particular value as you wish. Then you can simulate the program's action whilst watching the registers change as you press the space bar to single step through the code.

This is essential for debugging and development, as is the excellent disassembler which can even display a program in memory at one address as if it were really located in another.

There is a full breakpoint handler and also a relocator which will attempt to change the execution address of a program as you require. All told this is another excellent tool for those in a development situation.

value for money 95%

H ★ ★ ★ ★ ★

Beebugsoft Toolkit

£27 non members, £16.50 members

This ROM has a very good pedigree coming from the premier national user group for the BBC micro. Even better, it lives up to its pedigree. It contains all the usual memory display and editing routines, including a

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program movement utility, allowing the development of cassette line renumbering facility.

But it is most impressive in its range of utilities. The first of these is the on screen editor which allows the modification of BASIC lines without retyping and can be toggled to insert or to overtype any mistakes. Added to this is a new type of error reporting routine which displays the cursor at any line giving an error so that you can correct it immediately, presuming of course you know how to!

A program compactor removes all extra spaces and REMs and can get you out of difficulties when memory is scarce.

The final and most vital utility is the *UTIL command which gives access to nine different options from a master menu. These include searches for strings, variables and even reserved words: this can also include global replacement. There is a program line movement facility allowing test programs to be changed into procedures, as well as more general use. There are also list routines for string, numeric and resident variables showing not only names but also values. Lastly there is a procedure list function which I use a great deal. The ROM contains even more routines which I haven't space to mention but, for anyone serious about developing programs on the BBC in BASIC, this is a truly magnificent tool, one without which I could not cope now.

value for money 100%

H ★ ★ ★ ★ ★

Disc Doctor from Computer Concepts

Disc Doctor allows manipulation of programs, files, sectors and bytes on your disc, even those in corrupted files and deleted programs. However, the software does have an irritating feature — it refuses to work with some disc faults which it reports as unhelpful and unspecified errors. The chip includes no less than nine programs for manipulating discs, plus DISCTAPE and TAPEDISC which automatically transfer files from discs to tape and tape to disc, respectively.

Using this package, you can search for text, construct discs to boot a menu of programs, format to 40 or 80 tracks and join several files. If you wish to load and save from disc you can, using the disassembler and memory altering program which form part of this package. One good feature is that almost any format for information can be used.

SWAP enables discs to have up to 60 files by providing two catalogues. It does not increase disc capacity of course, so the total size of 60 files cannot exceed 100K on a 40 track disc, but for applications with many short files (such as a utilities disc) this is just the job.

I have been using the chip for about a month, and have found no problems with it. Installation is easy, providing you have a spare sideways ROM socket or an expansion board. The chip contains its own HELP commands in case you are temporarily stuck for the format of a command, and seems very well thought out. I do not know how I managed without it and owning it has taught me a great deal about the BBC. If you use discs or write assembler programs then you must have this chip. It would be worth the price for half of the software provided!

N.W.

GTM ROM board
£38.95 (fitted)

This is the second ROM board I have used: the first one is not being reviewed as it has now been removed from the market and also as I cannot find words dreadful enough to describe it! The GTM board is the exact opposite to the first one. It is well designed, simple to use and causes no problems whatsoever.

The board is designed to be fitted under the keyboard and so avoids the troubles caused by some other boards which tend to build up heat inside the casing, especially above the memory chips. The board's capacity is 13 ROM which means that, with the main circuit board's three sockets, you can insert up to 16 ROMs — the maximum amount the BBC can page. I have inserted the maximum number of ROMs and then used the machine for periods of up to 20 hours at a stretch with no ill effects whatsoever.

A further design feature is that, being under the keyboard, the chances of the board interfering with other add-ons, e.g. RAM memory boards or internal second processors, is minimised.

Fitting is included in the price and this is worth taking advantage of. The work is usually carried out while you wait or within one day.

value for money 90%

H ★ ★ ★ ★ ★

GTM's Super Utility 2
£22.50

This is a very new ROM; I have used one of the development versions but the release version will be available now. The combination of utilities on this ROM is unusual but there is a great deal to choose from and some will become firm favourites I'm sure. By far the most powerful command available is the *BASED or BASIC editor command. This produces a menu on screen which uses simple and sensible command letters to take action as desired.

It has full search and replace facilities for BASIC variables, strings and even reserved words and unlike the Beebugsoft toolkit it will tokenise those words it can, so that it is simplicity itself to find all the procedures beginning with 'b' by setting the search string as 'PROCb'. You are then given the number of matches and can select to display either the line numbers found or the full lines.

There are even facilities to search for GOTOs, GOSUBs and RESTOREs with a particular line number following and to have 'wildcard' searches. You could also select to move, copy or renumber lines as you wish but my favourite is the packing routine used to save memory. This not only removes REMs and spaces but can also concentrate lines so that you don't waste space with extra line numbers, remove assembler comments, and even change variable names to the shortest length possible without putting bugs in the program.

There are also other commands besides the BASIC editor. These cover formatting assembler listings, formatting disc drives, finding the amount of spare space on a disc, verifying discs, cataloging variables and you are even supplied with two screen dumps each for the Epson and NEC range of printers. This is a truly excellent ROM for BASIC programmers and can be highly recommended to even those with very simple systems. As you buy a printer and then a disc drive many of your needs will already have been satisfied by this ROM.

value for money 100%

H ★ ★ ★ ★ ★

Molimerx: Micromon
£32.20

This program, a machine code monitor, is also available on tape and disc and for this reason the instructions are not too clear. The problem is that they cover all the versions and the section on the EPROM version is right at the end.

The instructions also make it clear that there are two peculiarities (their words) about the program. The first of these is important and should have been changed before release: the ROM automatically presumes you are in the tape filing system and in order to save to disc you have to remember to change filing systems.

Unfortunately these are not the only problems this ROM causes. There are others which you would soon discover if you had more than one ROM resident in your machine at a time.

Something is wrong in the way this ROM is written and it corrupts the action of others you may wish to use. Add to this the fact that the *HELP facility is not active and that the breakpoint handler doesn't stop if you call a routine in memory, and you have a ROM of little use and poor value.

However, the company is very dependable and fully supports its software, so if you do have problems there is someone to turn to. This cannot excuse a program of this standard being released prematurely.

value for money 30%

H ★ ★

Molimerx Micromon
£32.20

This is a BASIC toolkit from the producers of the previous program. Unlike Micromon, this one was written as a ROM program and therefore the instructions are much less confusing. Unfortunately it does share the problem of affecting other ROMs which are in the machine at the same time, for example, the Disc Doctor tape to disc transfer routine is completely corrupted by simply having this ROM in the machine.

The commands in the ROM are very well organised, i.e. they cover a fairly wide range of action yet are simple to operate. There are *CHANGE and *LIST commands which work on string, numeric and array variables as well as literal strings, a *FIND command which will find reserved words very easily indeed. There are program compactors engagingly named *STRIP, and a routine to put the spaces back too (*PAD). The unique command is the *CHARS, one which displays all the normal ASCII and the user defined characters. This can be very useful if you do a great deal of games programming or need to use special characters for science, engineering etc. The *VAL command is another particularly useful and easy one, it can be followed by a 'type' parameter and it will list the values of any type of variable including the array elements you have defined and filled. From what I have said so far you can see that this is a good piece of firmware but in its present form it is of no use to anyone who has other ROMs resident.

value for money 60%

H ★ ★ ★

PACE: Commstar
£34.01

This ROM can only be described as a very specialised tool for those to whom micro-to micro communication is not simply a toy but a vital need. The program here is an intelligent communications package to assist the connection of micros using modems and phone lines. This will allow you to pass data or programs to a friend or to pass messages via the various bulletin board systems around the country.

The firmware provides a simple to use method of matching protocols so that such interaction can take place. It is intelligent in that it has full memory buffering for input data, it is easily configured for different systems, it allows the full use of the machine operating system, handles all errors, contains an elapsed time clock so that your phone bills don't grow too much and has several operating modes including a chat mode for interactive use.

In all this is a well thought out piece of firmware which will be a vital tool for some users.

value for money 85%

L ★ ★ ★ ★

PACE: Toolstar
£34

This is another toolkit EPROM which is meant to help you develop programs. Unlike those mentioned above it is a hybrid of a BASIC programmer's toolkit and a machine code programmer's monitor. One of the outstanding features of this ROM is the extremely comprehensive, well written manual. Over 150 pages long, it is not only a manual but also a very informative and educational text for those who really know very little about the BBC's methods of program storage and the 6502 machine code instruction set. I feel that this makes the package ideal for the newcomer whilst at the same time being very useful for the old hand.

Toolstar has several unique features, one being the ability to be extended If you know how to write your own utilities then they can be used via this ROMs *EXTEND feature Without any doubt, the facility I find most useful is the *FLIST command This is used to produce a listing of a BASIC program even if it is corrupt and therefore not normally listable Allied to this command is a utility which will try to restructure a BASIC program and make it recoverable called *FIX There are also search routines numeric conversions, renumberers, CRC checks, disc formatter and many other utilities for BASIC programmers

The machine code writer is not forgotten either There is a very good disassembler which even allows you to go backwards through a program to recheck a section and which displays the name of all the operating system calls as they occur There are also full screen editing and breakpoint facilities in the commands Once again this is far from a full listing of the facilities offered by this ROM which has to be one of the best compromises between BASIC and machine code tools possible and will represent excellent value for those only able to purchase one ROM

value for money 95%

H ★ ★ ★ ★ ★

Softlife EPROM programmer

£77 05 (incl p&p)

This is one of a growing number of EPROM programmers now available for the BBC and one of the neatest I have seen The programmer is mounted in a small plastic case less than four inches long and three inches wide Another unusual feature is the single cable which comes out of the box — the only connection necessary is with the user port The reason for this is that the programmer 'pulls up' the 5 volts from the BBC for the 21 volts needed to program the EPROM

Its size and lack of power cable mean this can be used on any BBC, disc or tape, in any location The software for programming is, also unusually, supplied on an EPROM You remove it from the EPROM and record it to any filing system you wish to use This means that the cost given above includes an EPROM for your first program You don't need to keep the programmer software in as you can save that as many times as you wish

The software is good and gives most of the facilities you need, including the ability to program from a file, again unusual as most programmers only work from memory The most useful feature for a predominately BASIC programmer is the ability to program a *ROM filing system EPROM This means that your favourite program (BASIC or machine code) can live in your machine permanently and therefore be at your constant call I keep all my frequently used utilities on one such ROM and this has made life much easier

In summary, I have experienced no difficulty in using this product (and I had no previous experience), the software is easy to use and although the programming algorithm is slow it is still a very good buy

value for money 95%

H ★ ★ ★ ★ ★

Softsmith AIDS II

£25 (incl p&p)

This ROM is really a BASIC programmer's toolkit but it does also have a disassembler The ROM is used by typing *AIDS and from then on it is a very simple matter to choose the utility you desire from the menu that is presented

The menu includes disassembly, memory editor, search/replace, list formatter, variable dump, beeper and printer Most are reasonably obvious in both purpose and use but beeper is slightly unusual If you select this option one of the machine interrupts is trapped and the result is that every key you press causes a soft low pitched beep to sound I can think of uses for this in touch or copy typing as well as in education where children tend to crunch keyboards rather too heavily

The printer command is a toggle, i e you use it once to turn the printer on and again to turn it off This means that all the commands can be fed to the printer and the information they contain retained for future use

Besides typing *AIDS for the menu there are four other commands which can be used whilst developing programs They are *LLIST which is described as a 'program peruse' utility and makes the program scroll both up and down the screen in lines or pages on the command of the cursor keys The other three commands are for use on BASIC programs and can help you to speed up development considerably They are *LREN, *LMOVE and *LMERGE and they renumber move BASIC lines from one part of a program to another and allow the merging (copying) of lines either within one program or from another program completely

All these manipulation commands have a common syntax and are therefore very easy to use once you have learned the conventions There is also a program repair facility which will do its best to repair any problems which might have occurred to cause a Bad Program message To use this you simply select search from the main menu and it does the repairs automatically

All the utilities work well and are fairly easy to use, the menu selection making life very easy The only criticism I can make is that the use of tokens to search for BASIC keywords is rather cumbersome and difficult This is a good ROM for the first time user and is very competitively priced

value for money 85%

H ★ ★ ★ ★ ★

Digitizers

British Micro Grafpad

£168 75 (incl p&p)

If you would prefer to draw directly on a pad which is then transferred to the screen, rather than trace a drawing from a sheet, this may be the add-on for you The price given above includes the software package This is shown as an extra charge in the brochure, although how you can use the tablet without it I really don't know The tablet has an effective resolution of 320 x 256 which may seem good by business micro standards but is nowhere near as good as the BBC can support in Mode 0 However, this should be easier to use than the digitizers as there is a menu area on the pad which copes with all necessary key pressing very easily

The software supplied comprises two programs the first is a screen co-ordinate routine which displays the x and y values for any selected point and the second is more of a design package with circle, square and rectangle drawing facilities as well as freehand erasing and line drawing This also includes a printer dump

The company promises 'a family of educational software' soon

Although I haven't tried this product I cannot see how this is good value for money when you consider the facilities offered by the digitizers for a lower price I think there is a chance the price will fall as production rises but a much wider range of software is needed

value for money 50%

L ★ ★

Dollmore PL graphics system

£99 75

There is little doubt that this is the Rolls Royce of digitizers The main reason for this is not just the hardware component of the system but the superb software which accompanies it The reason for such high praise is that this is the only one of the plotters reviewed which allows the use of pictures generated in your own programs This is not only allowed but is made fairly simple due to the way in which the data is stored

Unlike other systems this one stores the picture information as data 'blocks', which can then be re-used, in an animation program for example In fact the very extensive demo program supplied with the system shows just how good it can be There is even a facility for moving user defined characters around the pictures!

The actual base/stylus unit is strong enough to support your TV or monitor, which is the ideal place to use it with the computer at the side I cannot say that the picture drawing software is easy to use but then it is so powerful it has to be fairly complex The choice of keys is very sensible and besides a very full manual, 56 pages long, you are given a summary card and a user defined key strip There are two pictures provided on which to practise and these give very good results on screen

The only reservations I have about the system are its small drawing area (A4), the restriction to Modes 4 and 5 only and the rather loose feel of the arm, but these are highly insignificant compared to its other advantages This is well worth the money if you need a good digitizer

value for money 75%

H ★ ★ ★ ★ ★

RD digital tracer

£69 95

Of the three products of this nature I have reviewed, this comes in the smallest box and may therefore have special advantages for those who use their micro in the cupboard Seriously though, in spite of its box this is a very good product indeed

It has several unique features Unlike the others this product doesn't have a base board and can therefore be fixed anywhere This could be ideal if you want to use it on a desk which is already in position If you are going to use it in a fixed position it should be screwed down or attached with the sticky strip provided.

Another unique feature is the program which allows you to create and use up to 15 screens of picture and text in Mode 7 The tracer itself is made of plastic and, although not very good looking, is extremely functional as the material is so light,

This is the only one of the digitizers which had a cross hair style tracer which I found to be much more accurate than the others, as it gave better control The software is very well written and easy to modify for your own use as it is written in BASIC One of the special features is the ANIMATE facility which allows you to make animated displays using the logical/actual colour change technique There is a screen dumping routine for Epson and Seikosha printers but, being in BASIC, this is very slow indeed

All told this is a very impressive product with many features which are likely to make it a popular choice

value for money 95%

H ★ ★ ★ ★ ★

Tarren DigiGraph system

£78 20

This is a very robust and elegant digitizer which will be of great interest to those who wish to use it with children or in applications where durability is an essential The base board is laminated and has a wipe clean surface to which you could stick sellotape and attach drawings It is reasonably light and this makes it easy to store and transport

The software is good and the manual and worksheets accompanying the package are excellent They were developed in a school and the 12 sheets form a fairly comprehensive tutorial on using the machine, incorporating all the basics, and demonstrations of highly skilled technical drawing The software is easy to use and has sensible key instructions, e g H = horizontal line, C = circle The package also contains a screen dumping routine for Epson and Walters printers

I particularly like the status line which gives you all the major information you need at a glance Another excellent feature is the scaling facility which allows you to increase or decrease the screen size of a

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particular picture.

The only difficulty I have found is that the arms seem a little stiff, which can lead to slightly jerky movements and lines on screen. Most people will be fully satisfied with the facilities of this system rightly so, as it is a good, easy to use product with an excellent large drawing area.

value for money 78%

H ★ ★ ★ ★

Modems

Minor Miracles World Standard modem
£118 (incl p&p)

This is without a doubt the modem for the enthusiast. Not only does it offer access to Prestel, but also to almost every other database or bulletin board in the world. In total it offers six different standards all controlled by a rotary switch on the front panel. This means that you can even spurn the databases completely and ring up your friend and swop jokes or programs via the keyboard and computer.

One thing to note though is that the price given doesn't include software and you might need to develop some of this yourself. This is perfectly reasonable in this case, as there are so many standards available the configuration of the software would have been a nightmare. It may be worth looking at one of the communication ROMs to help this task. While I haven't had a chance to see one of these modems yet, it has an exciting specification and should be of great interest to the serious user.

value for money 95%

L ★ ★ ★ ★

Prism Accoustic Modem
£60.10 (incl p&p)

This is the first modem I ever used and it certainly was a good way to start especially in price terms. As the name suggests this is an accoustic modem, i.e. the telephone handset plugs into the top and then the micro communicates, using sound signals, to and from the handset. This can be a good arrangement but I use modems in a noisy place and the amount of corruption is totally unacceptable. This does also mean that you must have a standard dial telephone by the computer.

The software included in the price is good and fairly easy to use although I do think the manual could explain some things better. The software doesn't include an offline message editor, which is a real pity, although there are programs to do this job on Prestel, usually free.

This is a 1200/75 baud modem which means that, while you can use it to access Prestel standard databases, it cannot be used for direct user to-user communication. This is not really a surprise when you consider the price. Overall this is a good modem for beginners who want to experiment without losing too much money if they don't like it. Unlikely to charm seasoned users.

value for money 80%

H ★ ★ ★ ★

Tandata tm100
£124.40 (incl p&p)

This has to be one of the best value modems on the market at the moment. Although it is only usable at 1200/75 baud, i.e. Prestel standard, it has a host of very worthwhile features.

This modem features a battery powered memory for up to eight numbers including identifiers and passwords if you wish, an autodial and redial facility if the number does not respond and a very simple method of changing those numbers.

This is also a hardwired modem, i.e. it plugs directly into the Telecom telephone socket, so there is no chance of data corruption from extraneous noise. The price given above includes the software for the system and all leads.

The software and manual provoke my only real criticism. I think more thought and planning for the new user could have been put into the manual. The company is aware of this, however and is going to rewrite the manual soon. In the meantime it is issuing a supplementary information sheet to users.

In general the software is good and offers some valuable facilities, such as frame tagging, so that you can easily go back to important frames, and an offline message editor which can save you pounds in phone bills.

There is no doubt that I have fallen in love with this modem and will be very loath to have to go back to using my accoustic modem again.

value for money 90%

H ★ ★ ★ ★ ★

Micro Robotics

Beasty by Commotion
£49.95

The heart of the Beasty is an interface capable of controlling several servos through the software in the BBC. The applications for a product of this type are enormous. Models and puppets can be moved, switches and cameras can be directed by remote control, as well as anything else you can think of.

Beasty is meant to be connected to up to four direct feedback servos of the type usually used in flying or racing car models. These are not only simple to use but easily prohibitive. As the Beasty is designed for the standard servos it should also be easy to find parts and accessories.

In the future the company is intending to sell a robotic arm kit which will connect to the Beasty and cost about £75 — considerably less than current models. Commotion also markets a control ROM which takes the hard work out of the input/output control at a cost of about £45.

All told, this seems to be a very well thought out and simple way to try out the field of microcomputer control without great expense or high level of programming expertise.

value for money 90%

L ★ ★ ★ ★

BBC Buggy by Economatics
£189 (incl p&p)

OK, I thought, so this is the famous BBC buggy. It's just a turtle which wanders around the floor and draws pretty pictures. But I was wrong, as I soon found out, the Buggy I was using didn't even have a pen (although one is available). Now I'm glad it didn't because it made me explore the machine and its possibilities thoroughly. It really is something.

It is more than a turtle because of its range of sensors. As I explained to the children, it has two eyes, two feet and even two hands. Using its hands it can find and measure an object placed in its track, using one eye it can find a light and tell you, using its other eye it can follow a black line, read bar codes to play music or learn a new tricky movement. This is all possible through the very sophisticated software supplied with it.

There is no doubt that after using it I wanted to know and learn more about artificial intelligence and felt I could make the program more efficient if I could only make it do this or that or perhaps the other. That is what the Buggy is really about. Yes, it will make pretty patterns if you want, but it can do so much more too. The whole package is very simple to use (once you have built the Buggy, that is) all the leads are supplied and they are easily fitted to the BBC. The documentation is good and the software, as I have said, leaves you itching to take it apart so you can find out how it works.

Whilst I can't honestly say I would like to spend this amount of money on such a sophisticated toy, everything about it is well designed and I feel that it would have a place in most schools.

value for money 80%

H ★ ★ ★ ★

Keyboards and joysticks

Flight Link control joysticks
£17.95/£18.95

The prices given above are from my local dealer, since these sticks are only sold through such outlets. Flight Link was one of the first companies to start making joysticks for home computers. Their product is very well designed and very good value for money. The prices given above are for the analogue (J6) and self centring types (J7) respectively. They come in pairs which connect together at the lead end therefore have a single plug.

The analogue type are the ones to buy if you only want to buy one pair of joysticks, as these allow the computer to have information about any movement you choose to make. This means that they can be used for any of the drawing programs or games such as Mission Control which need that information.

The reason why the self centring stick is produced is for the extra feel this gives you on some games where the only movements possible are up/down and left/right or combinations of these. This type of stick does not contain potentiometers but has switches giving only three possible values on each channel.

The only criticism I have to make about these joysticks is the small fire button which, while very positive, can get lost at times.

value for money 90%

H ★ ★ ★ ★ ★

Maltron keyboard
£201.25

Why is the skill of touch typing so rarely learned by computer users? Maltron believes that it is largely due to the ancient design of the keyboard. The Maltron keyboard was designed 'for hands', and, instead of being flat and rectangular, is undulating and separated into two discrete areas, one for each hand. This is a case of application of ergonomics to the design of the human interface of a machine.

The manufacturer claims that there are many benefits in its revolutionary design. These include greater accuracy, reduced learning time and greater operational comfort, leading to less fatigue. The BBC model includes all the function keys and a much more sensibly placed BREAK key. The cursor keys are on different sides of the keyboard, to be operated by different hands, very sensible. The keyboard is connected by a ribbon cable and leaves the BBC's own keyboard free for use if you wish, although the Maltron can be changed to an ordinary QWERTY style by a switch.

Obviously this is not an add-on for the ordinary user, but if you use the keyboard a great deal it is worth investigating.

value for money 70%

H ★ ★ ★ ★

Voltmace joystick
£12.95 (adaptor box £13.95, software cassette £5.95)

This is not just another joystick. It is far more. Each handset also comprises some 14 buttons which can be used to form a numeric, or other, keypad. In order to use the joystick fully, I would recommend you buy the software, as this not only allows you to make non joystick games joystick compatible but also to change the sensitivity of the stick.

The stick itself is centre sprung (self centring) but is also fully analogue. This means it has a good feel. It is to the full BBC specification and should be usable with all games and drawing programs.

The software is very easy to use and, being menu driven, you simply

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CUT N VAL – MATHEMATICS (BBC/B)

CUT N VAL is a highly versatile mathematics program suitable for use with children from 7 to 16+ The program is designed to help the understanding of a wide range of mathematical expressions and allows an exploratory or investigative approach by the user The package comes complete with four sets of demonstration questions and full instructions Further exercise sets are available from MP Software and can easily be compiled
£10 50 (Cass) **£14 50** (Disc)

ACCURATE — MATHEMATICS (BBC/B)

ACCURATE is a program designed to assist students obtain a reasonable estimate to questions which require an expression to be evaluated It is suitable for use with students from 7 to 18 The program gives a set of questions which must be answered within a certain degree of accuracy selected from a menu at the start of the program They may be set as questions with answers accurate to 5 significant figures or between 5 and 30% of the answer as required The program comes with full instructions and demonstration exercises Further exercise sets are available
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follow the instructions given If you wish to use the keypads fully then you must also purchase the adaptor box which plugs into both the analogue and user port this then allows the insertion of two joysticks or a joystick and a digitizer

To use the pads you first configure the software so that the keys give the result you desire — they could become a numeric keypad, a new set of function keys or even programmed to insert BASIC keywords

This is an excellent joystick in its own right but if you also want a keypad then it becomes double valuable and of course, there is no reason why you cannot start with one stick and buy the box later I always use this as my first joystick now

value for money 95%

H ★ ★ ★ ★ ★

Light Pens

RH Electronics light pen

£49 95

This package is not the simplest light pen for the BBC but it is one of the most professional and robust ones For the price you get the light pen and its associated electronics, a demonstration software package including the driver programs and a 10-page manual

The pen plugs into the joystick port at the rear of the machine and cannot be used directly for input, as it first needs a sophisticated machine code driver program to be installed All the details of how to use the driver are in the manual, however the manual is rather technically written and not very clear There are many options available e g input accepted on pressing releasing or constantly depressing the switch, but they are not as simple to change as they could be This means that using the pen for your own programs is not easy and is very much trial and error at first

Construction and design of the pen are excellent Electronics are housed in a colour matched metal case The pen has an LED indicator in the rear so that you can tell at a glance when a valid signal is being read There is also a switch in the tip to tell the pen when to input the desired position This is very easy to use and almost foolproof, making this pen suitable for quite young children

The demonstration software is very simple, with only a line-drawing program and noughts and crosses to choose from These work well enough but are not very interesting They are written in BASIC though so that you can see how they work and try the ideas on your own software

Although this is an expensive item it is not very simple to use, and there is currently very little software (only a single screen drawing package to my knowledge) restricting its use to those people wanting to create their own software More for those with a specific need for light pen input than for the average computer user

value for money 50%

H ★ ★ ★

Robin light pen

£29 90/£41 40

This company produces two models of pen, hence two prices. The first price covers the standard pen used for this review, and the second price is for the professional pen which has a touch sensitive switch The pens are supplied with a painting and drawing program on cassette (disc £5 75 extra) and written details of how the pen may be used in your own programs

This is a very simple procedure, when compared to the RH pen, comprising only some 20 lines of BASIC The drawing program supplied is simple but fairly responsive and easy to use and makes a good demonstration of the pen's possibilities The pen itself is a ballpoint type stick with a lead and analogue plug at the end There is a fine tip attached to the end but this can be removed if you need to increase sensitivity I found that this had to be permanently removed if the pen was to get any signals from my colour monitor

The feature which really sets this pen above the others is the range of software already available I have used four packs, detailed here with their prices

Synthesiser (£7 50) is a souped-up stylophone type program which enables the pen to play 14 sounds at four tempos with a range of four octaves and with harmony

Matching Series (£11 50) Two programs, one involving colour, size and shape matching the other letter and number matching These are well written educational programs to a high standard

Logic Puzzles (£14 38) Three programs all involving the development of logical strategies of different kinds The ubiquitous Tower of Hanoi a Sliding Block puzzle and the most intriguing one of all Space Shuttle

Letter Formation teaches the child to write the lower case letters with the pen

The company also plans to release a talking dictionary later this year in which the child simply points the pen at a word and the word is spoken

This pen offers good value and easy program control besides good software and can be recommended to those interested in alternative input media

value for money 90%

H ★ ★ ★ ★ ★

Memory expansion board

Aries B20 memory board

£99 95

This board can give you 32K of memory on the standard BBC computer, or so it claims Its main feature is that you can use the high resolution graphics and still retain all the memory you would have if you were using lesser graphic modes Using the RAM for graphics is by far the easiest of its applications all you do is insert the EPROM which comes with the unit and then write as big a graphics program as you like All the screen will be stored on the Aries board and therefore not take up room you may need for the program

The less RAM the screen occupies the less the Aries board is actually used meaning that you always have 28K available whichever mode you are in If you are capable of writing the control software required then you could also use the board for data storage (although not for BASIC programs) and have two banks of data in memory at one time The board can also be switched off by a single command to give compatibility with all existing games or application software

Whilst the board does all that is claimed of it, I cannot believe that it is what most users need or want I am firmly of the belief that this is a specialist product for those requiring high resolution graphics programs of long length or for those who have the skill to use such data banks in their own programs

value for money 60%

H ★ ★ ★

Stands, cases and covers

Gralugate's keyboard cover

99p

This has to be the simplest and cheapest of the add ons featured here and potentially one of the most useful This cover is a vacuum moulded clear plastic cover shaped to closely fit over the keys on the computer It rests around the sides but encloses the keyboard completely and keeps out all moisture and dust The product does all that is claimed of it and is particularly suited to those who use computer consoles of the type mentioned above as it is often impossible to use the overall type cover since you cannot get to the back of the machine easily This product fits the bill and I recommend it heartily

value for money 100%

H ★ ★ ★ ★ ★ ★

Intastor Micro aids case

check price with manufacturer

This is a very well finished case which will not only fully protect your micro computer but also hold most of your assessories The case is made in ABS plastic to the familiar black attaché case design and is fitted with vacuum-formed mouldings to keep everything in place There are spaces for the computer and leads a cassette player (maximum size 11 x 7 x 3 inches) several software cassettes and the manual

This is a great idea for those who either need mobility or tidiness in between use of the machine The only reservation I have concerns the fitments if your system becomes larger than the case can accommodate then you will have problems I much prefer the sort of case which has the minimum of fittings and the maximum of usable space for all those extras I need to carry

value for money 70%

L ★ ★ ★

Silent Computers consoles

£56 34 (extra module £19 54)

In case you hadn't noticed, the BBC computer case is made of plastic and cannot support the full weight of a monitor or TV This means that if you want your screen to be above your micro then you need to suport it on something else This has led Silent Computers to produce a colour matched computer console from aluminium

The console completely surrounds the back section of the BBC and is meant to be transportable without having to remove various leads Above the computer there is a shelf of two different heights 10 and 11 5 cm This should accommodate most cassette recorders or disc drives with ease, as well as the Torch disc pack

If you still don't have enough room, there is an extra module which bolts on to the console, providing space for the second processor or teletext adaptor At the same price as the extra module there is a printer or VDU stand, without a shelf which allows paper or the VDU to slip easily underneath The products seem well designed and finished but the prices are a bit steep

value for money 60%

L ★ ★ ★

Other products

Acacia's Non-Volatile RTC and RAM diary/filing system

£147

If you have a problem with your diary and you use the computer every day then this must be the product for you It is a plastic case about the size of a digital clock which attaches to the computer via the 1MHz bus and the auxiliary power output, but in order to make the product usable with others there is a replacement socket on the rear of the box for disc drives, etc There is also a ROM to be installed on the BBC's main board

Once this is done you have a diary attached to the BBC running a real time clock so that you can set it to remind you of anything on almost any time scale from seconds to years Not only that, but the software is arranged so that you can be reminded about a regular appointment as many times as you like at whatever interval you need Each reminder can have a few lines of text attached so that you have all the information you need at the time The alarm goes off via the BBC's speaker but doesn't

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These courses use well proven Dr Watson formula that has been described by the critics as Worth its weight in gold No prior knowledge of assembly language is assumed and the aim is to ensure that every reader really succeeds.

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£9.95
BOOK & TAPE COURSE

BASIC Adventures in Space (age 7 upwards)

This is for the more junior reader and is written as a three part adventure story which teaches the language BASIC Again full software is provided on tape The tape also includes four CAL (Computer Aided Learning) rpograms which teach the major BASIC commands and demonstrate a program in use

This novel approach combines a story that is compulsive reading for the young reader with a carefully structured approach to BASIC intricately interwoven into the text Also each BASIC command covered is given a separate careful explanation in a special easy reference section in the second half of the book.

Soon available for the ELECTRON

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★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

interrupt anything you are doing on screen until you want a readout

Besides all this you can have a full clock display anytime you are in Mode 7 on the top line of the screen The non-volatile RAM is also a very useful tool, in that you can store short but vital programs such as key definitions so that they autoboot each time you switch the power on The diary can be set to give you messages at this time too

There is no doubt that this is a very competently designed tool with excellent simple control software However, I doubt whether it will be fully used by any but the regular business user For such a person it might make a very efficient, if a little unattractive personal secretary

value for money 80%

H ★ ★ ★ ★ ★

Acorn add-ons

Acorn also makes a whole range of add-ons for the BBC machine, some of which are rapidly becoming legends in their own right This is not because they are particularly highly regarded, but because some have never been seen outside an exhibition hall (and some not even inside one!), it would therefore be difficult to review them all and I have decide to just list them with a few notes about each

Teletext Adaptor £225 This does exist now and has been growing in usefulness as the weeks pass The 'free' software is developing too but it is still very much aimed at education and not really very useful to the average hobbyist You must also have a very good aerial system close to the computer

Speech Synthesis £55 This system gives you 165 words plus all the letters of the alphabet for your money The quality is excellent but it is so difficult to make new words that I have now given up completely and sold my system You may have more patience

6502 Second Processor £195 50 This is now due for release and is supposed to be on its way to customers This must be the memory add-on that really works There is also the 'Bitstik' which gives a very fine CAD system too Well worth an investigation

IEEE Interface This is really meant for the control and display of laboratory instruments such as oscilloscopes, voltmeters and frequency meters I doubt this will find its way into very many homes

Excet Monitoring Unit (bits and bytes)

£99

This is a very accurate and flexible monitoring unit which attaches to the BBC to make it both a measuring and display tool The measurements it can make are temperature, resistance voltages, current, power, time and light — all to an accuracy better than 1% There is an unlimited choice of scales with autoscaling and axis labelling on graphs It can display up to six readings simultaneously and has a large character mode for group work

The software has three display modes large character single variable six variables double height and graphs of any two variables against one another The connection is to the power supply socket and to the analogue port, which could be a problem if you use disc drives but is fine for cassette based machines The price includes the instrument temperature probe, light sensor, three sets of electrical probes, leads and connectors, software on cassette, manual and application notes In short, everything you are likely to need This unit does seem to be remarkable value for money

value for money 95%

L ★ ★ ★ ★ ★

Flip-Strip

£1 75

The user defined function key system is a great boon to any one who uses wordprocessors business programs or even adventure games That is, until you have a collection of key definition strips and they get all mixed up or lost under TV's, etc This is where Flip-Strip comes in It is a set of blank key definition strips spiral bound at the top edge, so all you do is copy or stick the definitions you need on to these blanks and they can never be lost again You slip the thick outer cover under the perspex on the BBC and then flip the strip to your heart's content A great idea and well worth the money

value for money 90%

H ★ ★ ★ ★ ★

GTM's Sound Pick off module

£6 95

This is similar in concept to Micro Advent's Microvoc, being a plug-in module for taking the sound output to the back of the machine and providing a volume control at the same time Fitting is very simple and you can plug your micro into any speaker of your choice, You could even plug it into an amplifier on a tape recorder, as I have done for demonstration purposes

There are two styles available one for issue 2 and 3 boards which terminates in a DIN socket, the other for later boards with a minijack plug Both are mounted on a colour matched plate which simply screws on to the machine via one of the fixing holes They are particularly neat when fitted, as the volume control is so small it does not stick out at all

value for money 90%

H ★ ★ ★ ★ ★

Late releases (Electron)

Sir Computers ROM Board

contact dealer for price

This company has now announced the first ROM board for this machine but unfortunately it was not available for testing before press date The board offers the ability to use those ROMs developed for the BBC which don't use those features absent from the Electron The list so far includes VIEW for word processing, FORTH from HCCS and the Graphics Extension ROM from Computer Concepts There are distinct indications that there will be ROMs produced for the Electron as the Board becomes more popular The board can hold up to 12 of the ROMs and all are available 'at the touch of a button'

Although I haven't seen the device I'm certain that it will become a very popular product as it will allow the Electron to be used for serious software development and word processing

The other major feature of the board is its ability to hold static RAM Four of the sockets can be configured in this way so that you can test any machine code routines you are developing without having to write them into EPROMs and then have to be continually erasing them

value for money 80%

L ★ ★ ★ ★

First Byte's Joystick Interface

£24 95

This is one Electron add-on I have actually used, and a very good product it is too The interface comprises a small cream plastic case with an edge connector to fit the Electron expansion port and a socket for an Atari type joystick. This seems to me to be a very good design feature since the Atari type sticks are widely available at a reasonable price

There is also a joystick driver program supplied with the interface and this has been pre-programmed for about 30 of the currently available Electron games The software works well and is simplicity itself as I found by playing the games included. If you wish to use the interface with your own software then full instructions on how to do so are also given

However it is important to note that, unlike the BBC joystick port, this is a switched interface only and therefore only on/off states can be checked This is unlikely to be a problem as its main use will be with games I must say that when I used the Quickshot 2 joystick the response was very good indeed The only reservation I have is that there is only one socket available so it cannot be used for two-player games

value for money 90%

H ★ ★ ★ ★ ★

Sir Computers Printer/ADC Port

contact supplier for price

This device is an interesting synthesis of products aimed at both the serious user and the games player For the serious user there is the printer facility which, by a clever use of ROM software on the board itself, behaves in exactly the same way as the BBC machine This means that any program written for the BBC which uses a printer will work, without any modifications, on the Electron The software also allows full use of the printer control commands such as *FX 5 and *FX 6, enabling any parallel printer which will interface to the BBC to be used on this machine For games players there is a BBC compatible joystick interface with a full 10 bit analogue input facility This means that besides simple left/right and up/down movement there is also information about the strength of such available movement

For programs like design packages this type of information is essential and it also means that such items as digitisers, graphic tablets and other measuring devices may be used too The driving software is again in a ROM so that all the BBC standard calls are available

value for money 90%

L ★ ★ ★ ★ ★

Microvoc from Micro Advent

£23 (incl p&p)

This product and the one from GTM both improve the sound on the BBC machine This product comprises a plug-in module to take the BBC sound output to the back of the machine and two spherical speakers to improve the quality and volume available The whole unit is very simple to fit and requires no soldering whatsoever, thus keeping your guarantee valid The speakers can be disconnected easily and the volume control will then adjust the volume of the internal speaker.

This is a simple and moderately priced product for those who wish to produce better music from their micros It comes with a plug for the 1MhZ bus to eliminate the buzz on issue 2 and 3 machines

value for money 70%

L ★ ★ ★ ★

Phi Mag's Phloopy

£99 + £26 for interface

Phloopy is a mass storage system designed to bridge the gap between tape recorders disc drives

Phloopy stores data on tape A special head records nine tracks side by side on 12 foot of ¼-inch tape Bytes of data are stored across the tape and the ninth track deals with error checking, using an on board processor — this means that Phloopy uses less RAM than most disc systems

Transfer rate is 10K per second, around 200 times faster than cassettes

The Loop Filing System uses the standard BBC filing system, BASIC commands and its own commands prefixed by an asterisk The continuous loop of tape is driven at 15 inches per second and touches the cartridge wall only occasionally, so tape lubricant is not needed

Phloopy plugs into the BBC's disc port and you must cut two resistors (Phi Mag says its engineers will help you if you have problems) The Loop Filing System ROM and a couple of plugs go into the BBC board

Each cartridge holds up to 100K data and extra cartridges cost £3 75 each + VAT

E G.

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Charming TI-99/4A £3.20

SofTI, 14 Station Rd, Brough, N Humberside

Ever fancied yourself as Prince Charming? Well here's your chance Wicked Count Bludnok has abducted Princess Softi and you must rescue her

The game starts in the catacombs a grid with numbered and lettered axes You have a limited time to type in co-ordinates to open tombs and find matching pairs of items useful for the rescue As each item only appears on the screen until another co-ordinate is entered or items matched, quick reactions and good memory are required

How well you fare determines in which of three chambers you will find the princess You may, however, wish to forget her and make for the money — or perhaps both! Various guards and obstacles appear in your path and careful use of items from the catacombs is essential for survival

Excellent use of the TI's capabilities is made, but during one of many attempts, 'Memory Full' brought the game to an abrupt end

Feminists, grinding their teeth at such a male chauvinistic theme, will be pleased to learn that there's a version available in which the roles are reversed

J.W

instructions	95%
playability	90%
graphics	95%
value for money	100%

★ ★ ★ ★ ★

Spy's Demise TI-99/4A £8

Challenger from Stainless Software, 10 Alstone Rd Stockport, Cheshire SK4 5AH

This game makes a welcome change from others based wholly on manual dexterity Its theme is typically American you against the KGB The documentation leads you into the Ukrainian diplomatic mission in Pyongyang Ahem While tippling in the Bangkok Hilton you have discovered that the KGB has the key to a fortune in computer data in the form of an encoded message Your task is to avoid the spritely guards through the 11 floors of the diplomatic mission, not once but nine times, building up a score and piecing together the message as it is revealed to you

If you are one of two UK solvers of the code you can win free software

You use the joystick or the keyboard's s and d keys to control movement, while the guards patrol continuously You can pause by pressing p or the fire button, but this is very difficult, needing quick mental reactions

Graphics are quite good, and interest is held very well indeed Needs Extended BASIC **P.B.**

instructions	90%
playability	90%
graphics	80%
value for money	75%

★ ★ ★ ★

Join the quest

Overcome obstacles to reach your goal in this batch of adventure games. Our panel of experts have got there first

Breakout/ Middle Kingdom Dragon £7.95

Dragon Data Kenfig Industrial Estate, Margam, Port Talbot, West Glam SA13 2PE

Breakout is a machine code version of the arcade game You must try to keep the ball in play, while knocking out bricks from a descending wall You can use a joystick or keys to control the bat There are five skill levels and a high-score chart A very enjoyable game which loaded with no problems

The second game is also in machine code and is a graphic adventure game At the start you choose the skill level and the speed at which messages are to be displayed on the screen

The object is to return magic rings to the sanctuary to become the ruler of middle kingdom You must search the catacombs, temple and pyramid before your strength runs out Many evil beings live here and they must be defeated Scattered objects will help you in your quest

The main display is a bird's eye view of the part of the building you are in Movement is controlled by the arrow keys

This is a thoroughly enjoyable adventure game Both games are very entertaining **J.E.M**

instructions	85%
playability	85%
graphics	90%
value for money	85%

★ ★ ★ ★

Solitaire/ Tower of Hanoi Sord M5 £8.95

Computer Games, CGL House, Goldings Hill, Loughton, Essex IG10 2RR

Two games at £8 95 for the standard Sord M5 with BASIC-I I wasn't expecting much from these programs as they are written in 4K and when I loaded them I was right They are very simple games

Solitaire is the traditional board game where you try and clear as many pieces as you can by jumping over the ones immediately next to them

Tower of Hanoi is also well known You've probably seen it published for the more popular micros in magazines It's the game in which you move the pyramid shaped edifice from one position to another, but only one tier can be moved at a time and you can only transfer smaller tiers on top of larger ones

Both programs were well fool-proofed and I could not crash them Considering the limitations of BASIC-I, they are quite good and you may find studying these programs more beneficial than reading the rather poorly written BASIC-I manual In any case I must confess I did enjoy these games and at £8.95 for two, you can't be too critical can you? **S S**

instructions	95%
playability	90%
graphics	30%
value for money	60%

★ ★ ★

Tumbledown Tower TI-99/4A £5.55

Solway, 6 Curzon St, Maryport Cumbria CA15 6LL

This is a fairly basic text only adventure game in which you explore a derelict tower Although the layout of the rooms and items in them remains the same in every run, it's still good fun to play

You are given limited stamina to last each game your stamina drains more rapidly as you collect various artefacts A strange assortment of monsters is also provided to sap strength whilst wandering around the tower You are always aggressive to them unless commanded otherwise Consequently amusing comments such as "you just killed a poor little bewildered dalek" appear on the screen

Commands are input as a single letter which means the computer has a vocabulary limited to a few verbs and directions You have the option to quit at any time, but your score is calculated before the final decision is taken

The ultimate quest of the adventure is not described in the instructions, but takes little imagination to guess Then it's just a matter of whether or not you have enough stamina to last the course **J.W.**

instructions	80%
playability	65%
graphics	N/A
value for money	60%

★ ★ ★

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```
10 POKE650,128:PRINT"J":POKE36879,9:POKE37154,127
15 PRINT"J":POKE36079,9:POKE37154,127
20 A=7933:D=7680:DIMM(506)
25 IFB>255THENB=0
27 IFA>8105THENA=A-22
28 IFA<7680TNENA=A+22
30 POKEA,B
35 GETA$
39 POKEA,32:IFB=32TNENPOKEA,82
40 IF((PEEK(37137))AND4)=0THENPOKEA,B:A=A-22:GOTO25
50 IF((PEEK(37137))AND8)=0THENPOKEA,B:A=A+22:GOTO25
60 IF((PEEK(37137))AND16)=0THENPOKEA,B:A=A-1:GOTO25
70 IF((PEEK(37152))AND128)=0THENPOKEA,B:A=A+1:GOTO25
80 IF((PEEK(37137))AND32)=0THENPOKEA,B:B=B+1:GOTO25
83 IFA$=""THENPOKEA,B:GOTO25
85 POKEA,B
87 IFA$="■"THENB=32
88 IFA$="■"THENB=160
89 IFA$="■"THENB=0
90 IFA$="■"THENPRINT"J"
91 IFA$="P"THENA=A-22
92 IFA$="."THENA=A+22
93 IFA$=";"THENA=A+1
94 IFA$="L"THENA=A-1
95 IFA$="F"THENB=B+1
96 IFB>255THENB=0
100 IFA$="M"THENGOSUB1000
110 IFA$="R"THENGOSUB1100
900 GOTO25
1000 FORT=1TO506:M(T)=PEEK(D):D=D+1:NEXT:D=7680:
RETURN
1100 PRINT"J":FORG=1TO506:POKED,M(G):D=D+1:NEXT:
D=7680:RETURN
```

How it works

1-9 REMs
10 colour
25-28 make sure pen does not leave screen
35 looks for an input
39-900 follow inputs
1000 stores picture in memory
1190 recalls picture

Inverse graphics 87 F1, 88 F3
89 F5, 90 F6

This program enables anyone with an unexpanded VIC-20 — with or without joystick — to design and store pictures and patterns.

The keys to use are.

P move pen up
full stop pen down
semi-colon pen right
L pen left
F changes character
M puts picture into memory
R recalls picture
F1 change pen to rubber
F5 change pen to block character
F6 clear screen

The joystick can be used for up, down, left and right commands

Hints on conversion

Conversion should not be difficult. The DIM on line 20 is for the memory, variable A is the position of the pen, B is the character of the pen. lines 40-90 are inputs from the joystick and are not necessary and all the POKEs less than 1000 are for colour and sound. The PRINT statement in line 15 clears the screen

This week – it's
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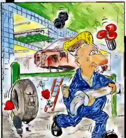

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Timeless, 3 Bridgend, Fauldhouse West Lothian, Scotland EH47 9HF

A space war game with a maze thrown in for good measure

The maze is the pathway through scanner rays emitted by alien spacecraft As long as you stay on this path you are well protected from their laser fire, and can pick them off with your own phaser cannons

As you hit each alien, however, the scanner ray emitted is destroyed with it and the maze therefore becomes smaller You find yourself having to cross areas where the enemy scans are stronger and where you will be hit and destroyed

Full instructions are printed on screen and there is a choice of keyboard or joystick operation

There is a speed control for your spaceship and by holding the direction key or joystick in one position the ship will travel faster, this speed may be important when you are crossing the danger zones

Graphics and colour are used to good effect and the whole programme is very well thought out Needs Extended BASIC

D B

instructions	90%
playability	85%
graphics	90%
value for money	85%

★ ★ ★ ★

Pengon
CBM 64 £8

Microdeal, 41 Truro Rd, St Austell, Cornwall PL25 5JE

Pengon reminds me of an arcade game I once played the principles are the same although there is a big difference in quality

The program doesn't take very long to load, only a few minutes No problems were encountered during loading Just in case you have trouble the tape contains recordings on both sides

You control a small penguin which can either smash or slide blocks of ice about a grid type screen Seals are moving around and coming after you To kill the seals you slide blocks of ice into them

The graphics aren't very interesting and certainly don't come up to the standards we now expect from software

The instructions are plentiful and you can't go wrong There is also a slip of paper in with the cassette which will allow you to join the Cuthbert Club This would indicate to me that the game is aimed at junior school children

K I.

instructions	80%
playability	70%
graphics	40%
value for money	40%

★ ★

Bongo
VIC-20 + 16K
£7.95

Anirog 29 West Hill, Dartford, Kent

This is a really outstanding game

The scenario is not new and is based on the ladder and platform concept Where it wins is in graphics, execution and addictiveness

The hero, under your control, is a supermouse called Bongo (it actually looks like a puppy but who cares?) You must collect diamonds distributed around the platforms so that you can win the heart of the princess The platforms are linked by ladders, trampolines, slides and teleporters

The platforms are also occupied by mean looking rats who if they catch you will dump you in the river at the bottom of the screen Clear the screen and you go on to the next one You can pick up bonus points by catching letters floating about the screen

Graphically the game is probably nearly as good as is possible on the VIC An expanded screen is used and the characters are animated pseudo-sprites built up from several redefined characters The animation is very nice and smooth The sound is poor but the graphics save the day

Overall a beauty of a tricky game The rats are particularly crafty and tough to avoid **A W.**

instructions	70%
ease of use	80%
graphics	95%
value for money	90%

★ ★ ★ ★

Zodiac
CBM 64 £7.95

Anirog, 29 West Hill, Dartford, Kent

Your task is to unravel the mysteries of the zodiac Demons are out to get you and you must kill them to collect the 12 signs of the zodiac

You move between rooms (each screen being one room or corridor) using the joystick If you can see any demons then you must shoot them and go on to collect the sign of the zodiac if there is one

Every so often there will be a gate opening when you receive an extra life To make the game harder the demons keep multiplying, taking away your extra lives

The graphics are quite good although the background screens are very similar and repetitive Obvious shortcuts have been made in the graphics, making the quality slightly less than it should be

Sound is good and very suitable The program makes up in sound for what it lacks in graphics

I found a bug in the game which happened about four times When moving out of some corridors you appear in the wrong place on the screen and lose a life **K I.**

instructions	40%
playability	70%
graphics	70%
value for money	70%

★ ★ ★

The Fall of Rome
Spectrum
£6.99

Argus Press Software, No 1 Golden Square, London W1R 3AB

Can you imagine yourself as the saviour of the ancient Roman empire, circa 395 AD?

In this game of strategy and tactics you get ample opportunity to steer the ancient Romans to victory — or defeat By ample opportunity I mean that the game takes place over 60 years, sectioned into five year periods of three phases

One phase gives you a chance to deploy your forces throughout the provinces, and during this phase a map of ancient Europe is frequently displayed and constantly updated

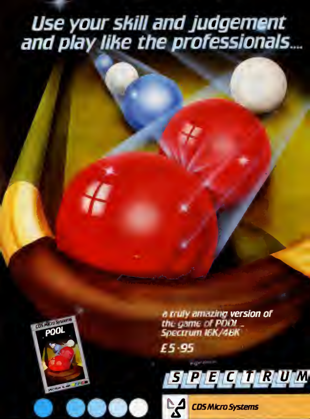
Your forces consist of mobile and static legions, cavalry and auxilium, which cost money to raise and maintain Another phase is concerned with the movement of your wealth and the third phase is the combat The inlay card contains a wealth of information, and you just follow the prompts on the screen

I am not a fan of strategy games but I must admit that this game made a refreshing change from shooting aliens

Si vis pacem, para bellum, sic transit gloria mundi! **B B.**

instructions	100%
playability	95%
graphics	95%
value for money	85%

★ ★ ★ ★ ★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What will you risk on the roll of the dice?

An ancient dice game transferred to computer by Peter Burnett. It runs on 16K or 48K Ataris

Yahtzee is a traditional dice game for one to six players in which each rolls five dice to try and achieve the combination shown on the score card.

After the first roll of the dice you have two chances to re-roll any of them. After your third roll you have to select the score option. If the dice are correct for that option you will be given a score, if not you get zero.

How it works

- **10-25** set up variables, initialise strings and arrays
- **35-65** transfer character set from ROM to RAM and re-define characters
- **75-180** sets up score card
- **200-210** name routine
- **220** move dice to top of screen
- **230-275** roll dice
- **300-350** title and instructions
- **353-370** request number of players, call name routine for each
- **380-425** main game loop (382 re sets dice to start)
- **430-465** check selection
- **500-623** checking routines to examine choice and give score
- **535-550** sort dice into value order in memory to make checking easier
- **625** score routine
- **700** end routine
- **800** sound routine

You cannot select the same option twice and the game ends when the last player has made his thirteenth selection.

The dice are redefined characters which are placed in a string so that they move together.

If any of the dice are to be rolled again they are sent back to the top of the screen. Before they are rolled again the string is checked for blank spaces and the "roll" strings have blanks placed in the correct positions.

Variables

- **MVCHR$** machine code string to move character set from ROM to RAM
- **S$** holds dice in start position
- **R1$, R2$, R3$** hold dice in roll positions
- **RF$** holds dice in its final position
- **N$** names string — holds up to six 10-letter names
- **NI$** individual names — parts of N$
- **BL$** blanking string
- **SC(6,19)** score array for up to six players
- **A$, B$** are used in sorting dice into order

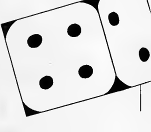
When a turn is complete the final roll of the dice is sorted out into numerical order and each of the dice is given a numerical name. It is then a lot simpler to check for score options. Checking values are incorporated so that you cannot choose the same option twice.

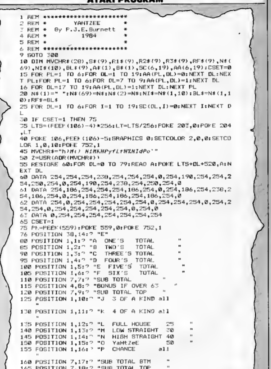
The scores for each player are held in an array and are displayed as each player starts a turn.

Apart from the character set movement, the game is all in BASIC and is an exercise in string handling.

It's also an enjoyable game!

Note: Italics in line 45 should be entered in inverse





```
1 REM ************************
2 REM *        YAHTZEE        *
3 REM *  By P.J.E.Burnett     *
4 REM *         1984          *
5 REM *                       *
6 REM ************************
9 GOTO 300
10 DIM MVCHR$(28),S$(9),R1$(9),R2$(9),R3$(9),RF$(9),N$(
69),NI$(10),BL$(9),A$(1),B$(1),SC(6,19),AA(6,19):CSET=0
15 FOR PL=1 TO 6:FOR DL=1 TO 19:AA(PL,DL)=0:NEXT DL:NEX
T PL:FOR PL=1 TO 6:FOR DL=7 TO 9:AA(PL,DL)=1:NEXT DL
16 FOR DL=17 TO 19:AA(PL,DL)=1:NEXT DL:NEXT PL
20 N$(1)=" ":N$(69)=N$:N$(2)=N$:NI$=N$(1,10):BL$=N$(1,1
0):RF$=BL$
25 FOR DL=1 TO 6:FOR I=1 TO 19:SC(DL,I)=0:NEXT I:NEXT D
L
30 IF CSET=1 THEN 75
35 LTS=(FEEK(106)-4)*256:LT=LTS/256:POKE 203,0:POKE 204
,LT
40 POKE 106,PEEK(106)-5:GRAPHICS 0:SETCOLOR 2,0,0:SETCO
LOR 1,0,10:POKE 752,1
45 MVCHR$="h)M() NIMKHPyfLtN%NIdPo`"
50 Z=USR(ADR(MVCHR$))
55 RESTORE 60:FOR DL=0 TO 79:READ A:POKE LTS+DL+520,A:N
EXT DL
60 DATA 254,254,254,238,254,254,254,0,254,190,254,254,2
54,250,254,0,254,190,254,238,254,250,254,0
61 DATA 254,186,254,254,254,186,254,0,254,186,254,238,2
54,186,254,0,254,186,254,186,254,186,254,0
62 DATA 254,0,254,254,254,254,254,0,254,254,254,0,254,2
54,254,0,254,254,254,254,254,0,254,0
63 DATA 0,254,254,254,254,254,254,254
65 CSET=1
75 Pk=PEEK(559):POKE 559,0:POKE 752,1
76 POSITION 38,14:? "E"
80 POSITION 1,1:? "A  ONE'S   TOTAL      "
85 POSITION 1,2:? "B  TWO'S   TOTAL      "
90 POSITION 1,3:? "C  THREE'S TOTAL      "
95 POSITION 1,4:? "D  FOUR'S  TOTAL      "
100 POSITION 1,5:? "E  FIVE'S  TOTAL      "
105 POSITION 1,6:? "F  SIX'S   TOTAL      "
110 POSITION 7,7:? "SUB TOTAL       "
115 POSITION 4,8:? "BONUS IF OVER 63    "
120 POSITION 7,9:? "SUB TOTAL TOP    "
125 POSITION 1,10:? "J  3 OF A KIND all
    "
130 POSITION 1,11:? "K  4 OF A KIND all
    "
135 POSITION 1,12:? "L  FULL HOUSE    25     "
140 POSITION 1,13:? "M  LOW STRAIGHT  30     "
145 POSITION 1,14:? "N  HIGH STRAIGHT 40     "
150 POSITION 1,15:? "O  YaHtZeE       50     "
155 POSITION 1,16:? "P  CHANCE       all
    "
160 POSITION 7,17:? "SUB TOTAL BTM    "
165 POSITION 7,18:? "SUB TOTAL TOP    "
170 POSITION 7,19:? "GRAND TOTAL -    "
175 POSITION 27,14:? "*"
```

```
180 POKE 756,LT:POKE 703,4:POKE 559,PK
185 RETURN
200 ? :? :? "ENTER NAME-10 LETTER MAX."
205 INPUT NI$:IF NI$="" THEN 200
210 N$(PL*10,PL*10+9)=NI$:RETURN
220 POSITION X,Y-1:? £6;" ":POSITION X,Y-14:? £6;CHR$(Z
):RETURN
230 A=2
232 S$="     ":R1$="     ":R2$=":R3$="
                               ":BL$="          "
234 S$="     ":R1$="     ":R2$=":R3$="
                               ":BL$="          "
235 FOR DL=1 TO 9 STEP 2:LOCATE 28+DL,1,Z
240 IF Z<>32 THEN M=INT(RND(0)*6)+1:RF$(DL,DL)=CHR$(M):
GOTO 250
245 S$(DL,DL)=" ":R1$(DL,DL)=" ":R2$(DL,DL)=" ":R3$(DL,
DL)=" "
250 NEXT DL:POSITION 29,1:? £6;BL$:FOR RL=1 TO 4
255 POSITION 29,A:? £6;R1$:FOR DL=1 TO 9:NEXT DL:POKE 5
3279,0:POSITION 29,A:? £6;BL$
260 POSITION 29,A+1:? £6;R2$:FOR DL=1 TO 9:NEXT DL:POKE
 53279,0:POSITION 29,A+1:? £6;BL$
265 POSITION 29,A+2:? £6;R3$:FOR DL=1 TO 9:NEXT DL:POKE
 53279,0:POSITION 29,A+2:? £6;BL$
270 A=A+3:NEXT RL:POSITION 29,14:? £6;RF$
275 ROLL=ROLL+1:RETURN
300 GRAPHICS 18:POKE 752,1:POSITION 6,5:? £6;"YahTzeE"
305 FOR DL=1 TO 400:PK=PEEK(53770):SOUND 0,PK,10,10:NEX
T DL:SOUND 0,0,0,0
309 GRAPHICS 0:SETCOLOR 1,0,0:SETCOLOR 2,0,10
310 POKE 752,1:? "EACH PLAYER TAKES TURNS TO ROLL THE
 DICE":? :? "EACH TURN CONSISTS OF THREE CHANCES TO":
315 ? "GET THE DICE TO SUIT ONE OF THE SCORE OPTIONS SH
OWN"
320 ? :? "TO ROLL THE DICE PLACE  UNDER THE *  (USING T
HE JOYSTICK) AND PRESS BUTTON"
325 ? :? "TO CHANGE DICE PLACE  UNDER DICE AND PRESS BU
TTON"
330 ? :? "TO GO TO SCORE OPTION PLACE  UNDER £ AND PRES
S BUTTON":? :? "YOU CAN SELECT ANY SCORE OPTION - ";
335 ? "YOU WILL SCORE 0 IF THE DICE DO NOT SUIT  THE OP
TION"
336 ? :? "                   PRESS SPACE BAR"
337 OPEN £1,4,0,"K:":GET £1,L:CLOSE £1:? "}"
340 ? "A FULL HOUSE IS 3 OF A KIND AND A PAIR":? "A LOW
 STRAIGHT IS A RUN OF 4"
345 ? :? "A HIGH STRAIGHT IS A RUN OF 5":? :? "YAHTZEE
IS ALL DICE THE SAME"
346 ? :? "       PRESS SPACE BAR CONTINUE":
347 OPEN £1,4,0,"K:":GET £1,L:CLOSE £1
350 ? £6;"}":SETCOLOR 2,0,0:GOSUB 10
355 ? "HOW MANY PLAYERS-1 TO 6"
360 TRAP 355:INPUT N:TRAP 40000
365 FOR DL=1 TO N:PK=PEEK(53770):SOUND 0,PK,8,10:FOR D=
1 TO 20:NEXT D:NEXT DL:SOUND 0,0,0,0
370 ? :? :FOR PL=1 TO N:GOSUB 200:NEXT PL
380 FOR TURN=1 TO 13:FOR PL=1 TO N:ROLL=0
382 S$="    "
```

```
390 GOSUB 670
393 POSITION 29,14:? £6;BL$
395 POSITION 29,1:? £6;S$:XX=26:Y=15:POSITION X,Y:? £6;
" ":POSITION XX,Y:? £6;""
396 ? :? :? N$(PL*10,PL*10+9);" ITS YOUR TURN"
397 FOR DL=96 TO -96 STEP -4:SOUND 0,ABS(DL),10,10:NEXT
 DL:SOUND 0,0,0,0
400 ST=STICK(0):FOR DL=1 TO 10:NEXT DL
405 IF ST=7 AND X<38 THEN XX=XX+1:GOTO 415
410 IF ST=11 AND X>26 THEN XX=XX-1
415 POSITION X,Y:? £6;" ":X=XX:POSITION X,Y:? £6;""
420 IF STRIG(0)=0 THEN 430
425 GOTO 400
427 P84=PEEK(84):P85=PEEK(85)
430 LOCATE X,Y-1,Z:POKE 84,P84:POKE 85,P85
435 IF Z=32 THEN 400
440 IF Z=69 THEN 500
445 IF Z<7 THEN GOSUB 220
450 IF Z=42 THEN GOSUB 230
455 IF ROLL=3 THEN 500
460 GOTO 400
465 NEXT PL:NEXT TURN
500 ROLL=0:OPEN £1,4,0,"K:":? :? :? "SELECT LETTER OF S
CORE OPTION"
505 GET £1,L:CLOSE £1:? :? :?
510 IF L<65 OR L>80 THEN 500
515 IF L>70 AND L<74 THEN 500
520 NO=L-64:IF NO>6 THEN 535
521 IF AA(PL,NO)=1 THEN 500
525 FOR DL=1 TO 9 STEP 2:IF ASC(RF$(DL,DL))=NO THEN SC(
PL,NO)=SC(PL,NO)+NO
530 NEXT DL:AA(PL,NO)=1:GOTO 625
535 FOR DL=1 TO 4:FOR D=1 TO 7 STEP 2:A$=RF$(D,D):B$=RF
$(D+2,D+2)
540 IF RF$(D+2,B+2)<RF$(D,D) THEN RF$(D+2,D+2)=A$:RF$(D
,D)=B$
545 NEXT D:NEXT DL
550 A=ASC(RF$(1,1)):B=ASC(RF$(3,3)):C=ASC(RF$(5,5)):D=A
SC(RF$(7,7)):E=ASC(RF$(9,9))
555 NOL=NO-9:ON NOL GOTO 560,570,580,590,600,610,620
560 IF AA(PL,NO)=1 THEN 500
563 AA(PL,NO)=1:IF (A=B AND A=C) OR (B=C AND B=D) OR (C
=D AND C=E) THEN SC(PL,NO)=A+B+C+D+E
565 GOTO 625
570 IF AA(PL,NO)=1 THEN 500
573 AA(PL,NO)=1:IF (A=B AND A=C AND A=D) OR (B=C AND B=
D AND B=E) THEN SC(PL,NO)=A+B+C+D+E
575 GOTO 625
580 IF AA(PL,NO)=1 THEN 500
583 AA(PL,NO)=1:IF (A=B AND A=C AND D=E) OR (A=B AND C=
D AND C=E) THEN SC(PL,NO)=25
585 GOTO 625
590 IF AA(PL,NO)=1 THEN 500
591 AA(PL,NO)=1:IF (A+B+C+D=4*A+6) OR (A+C+D+E=A*4+6) T
HEN SC(PL,NO)=30
593 IF (A+B+D+E=A*4+6) OR (B+C+D+E=B*4+6) THEN SC(PL,NO
)=30
595 GOTO 625
```

```
600 IF AA(PL,NO)=1 THEN 500
603 AA(PL,NO)=1:IF A+B+C+D+E=A*5+10 THEN SC(PL,NO)=40
605 GOTO 625
610 IF AA(PL,NO)=1 THEN 500
613 AA(PL,NO)=1:IF (A+B+C+D+E)/5=A THEN SC(PL,NO)=50:GO
SUB 800
615 GOTO 625
620 IF AA(PL,NO)=1 THEN 500
623 AA(PL,NO)=1:SC(PL,NO)=A+B+C+D+E
625 IF NO<7 THEN SC(PL,7)=SC(PL,7)+SC(PL,NO)
630 IF SC(PL,7)>63 THEN SC(PL,8)=35
635 SC(PL,9)=SC(PL,7)+SC(PL,8)
640 IF NO>9 THEN SC(PL,17)=SC(PL,17)+SC(PL,NO)
645 SC(PL,18)=SC(PL,9)
650 IF TURN=13 THEN SC(PL,19)=SC(PL,18)+SC(PL,17)
655 GOSUB 670
660 IF TURN=13 AND PL=N THEN 700
665 GOTO 465
670 FOR DL=1 TO 19:POSITION 22,DL
673 IF AA(PL,DL)=0 THEN ? £6;"   ":GOTO 690
675 IF BC(PL,DL)<10 THEN ? £6;"00";SC(PL,DL):GOTO 690
680 IF SC(PL,DL)<100 THEN ? £6;"0";SC(PL,DL):GOTO 690
685 ? £6;SC(PL,DL)
690 NEXT DL:FOR DL=1 TO 200:NEXT DL:RETURN
700 GRAPHICS 18:FOR DL=1 TO N:POSITION 3,DL
705 ? £6;N$(DL*10,DL*10+9);"   ";SC(DL,19):NEXT DL
710 GOTO 710
800 FOR DL=1 TO 5:SOUND 0,47,10,8:FOR L=1 TO 70:NEXT L:
SOUND 0,64,10,8:FOR L=1 TO 70:NEXT L:NEXT DL:SOUND 0,0,
0,0:RETURN
```

Solar SOFTWARE ©
CBM 64
Bizy BeeZZzz

When teddy to the picnic went
there came the smell of honey
So off he went to find the hive
to fill his empty tummy
The bees that guard honey pots
are sharpening up
their stings
as teddy fills his
empty tum sweet
melodys he
sings.

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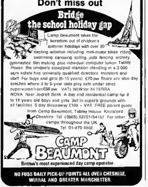

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CHARTS

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ARCADE

1	Jet Set Willy	Software Projects	Spectrum (1)
2	Blue Thunder	Richard Wilcox	Spectrum (-)
3	Scuba Dive	Durrell	Spectrum (5)
4	Moon Alert	Ocean	Spectrum (8)
5	Fighter Pilot	Digital	Spectrum ( )
6	Jack & The Beanstalk	Thor	Spectrum (6)
7	Space Pilot	Anirog	CBM 64 ( )
8	Codename MAT	Micromega	Spectrum (9)
9	Trashman	New Generation	Spectrum ( )
10	Manic Miner	Software Projects	CBM 64 (3)

NON-ARCADE

1	Fall of Rome	APS	Spectrum (1)
2	Test Match	CRL	Spectrum (6)
3	Wizard & Princess	Melbourne House	VIC 20 (9)
4	Flight Path 737	Anirog	CBM 64 (4)
5	Spec Graph	Anirog	Spectrum ( )
6	Practifile	Mark Micro	CBM 64 (-)
7	Twin Kingdom Valley	Bug Byte	CBM 64 (5)
8	Golf 64	Abrasco	CBM 64 (2)
9	Startrucker	Clever Clogs	Spectrum (7)
10	Mugsy	Melbourne House	Spectrum (-)

Compiled with the assistance of Britain's leading software distributors, including: Pinnacle, SDL, PCE, Websters, PCS and Software Centre.

SPECTRUM

1	Jet Set Willy	Software Projects (1)
2	Blue Thunder	Richard Wilcox (8)
3	Scuba Dive	Durrell (5)
4	Moon Alert	Ocean (8)
5	Fighter Pilot	Digital ( )
6	Jack & the Beanstalk	Thor (6)
7	Chequered Flag	Psion ( )
8	Codename MAT	Micromega (9)
9	Trashman	New Generation ( )
10	Pogo	Ocean (-)

COMMODORE 64

1	Manic Miner	Software Projects (1)
2	Practifile	Marketing Micro (-)
3	Inventory 64	Marketing Micro ( )
4	Practicalc	Marketing Micro (-)
5	Space Pilot	Anirog (6)
6	Black Hawk	Thorn EMI (2)
7	BMX Racers	Mastertronic ( )
8	Pedro	Imagine (5)
9	Space Walk	Mastertronic ( )
10	Practicalc	Marketing Micro ( )

DRAGON 32

1	Chuckie Egg	A & F (1)
2	Hungry Horace	Melbourne House (3)
3	Eightball	Microdeal ( )
4	Ugh!	Softek (5)
5	Up Periscope	Beyond (9)
6	Pedro	Imagine (2)
7	Kriegspiel	Beyond (8)
8	Frogger	Microdeal ( )
9	Space Shuttle Simulator	Microdeal (7)
10	Cuthbert in Space	Microdeal ( )

Compiled by W. H. Smith and Websters. Figures in brackets are last week's positions.

VIC-20

1	Wizard and the Princess	Melbourne House ( )
2	Sub Commander	Thorn EMI (2)
3	Duck Shoot	Mastertronic ( )
4	Snooker	Visions (7)
5	Tower of Evil	Thorn EMI (8)
6	Tank Commander	Thorn EMI (4)
7	Crazy Kong	Interceptor Micro (1)
8	M.L.B.A.T.E.T	Llamasoft (3)
9	Jet Pac	Ultimate (5)
10	Mine Madness	Thorn EMI (10)

BBC

1	Snooker	Acornsoft ( )
2	Q Man	MRM (2)
3	3D Munchy	MRM (6)
4	Aviator	Acornsoft ( )
5	Q Man's Brother	MRM (4)
6	Demolator	Visions (7)
7	Space Shuttle	Microdeal ( )
8	JCB Digger	Acornsoft ( )
9	Diamond Mine	MRM (4)
10	Over Drive	Superior Software ( )

ZX81

1	Krazy Kong	PSS (1)
2	Fantasy Games	Sinclair ( )
3	Mothership	Sinclair (5)
4	Flight Simulation	Sinclair (7)
5	Scramble	Quicksilva (2)
6	Chess	Sinclair (4)
7	Chess 1K	Sinclair ( )
8	Space Raiders	Sinclair (6)
9	Defenders	Quicksilva (8)
10	Black Crystal	Carnell (-)
10	Invaders	Quicksilva (9)
10	Vu-File	Sinclair ( )

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Tale of woe

Being one of those millions of Dads who are harassed into buying a computer for their children, I felt I must write and tell you this sad story.

I purchased a Commodore 64 at the end of February 1984 from Dixons. When I unpacked it the upper and lower casing were loose and you could see inside the computer. Of course it would not work.

Next day Dixons changed the computer and cassette deck for me. When I got it home, it worked and I typed in a program. The next day the CBM 64 packed up completely.

A few days later I was on to my third computer. I wrote to Commodore but had no reply. The third model worked for a few weeks off and on. At the end of March I phoned Commodore and was told the head was probably out on the cassette, and they offered to repair it. I paid out the postage to send it back, enclosing a letter asking for an explanation and recompense for my inconvenience.

A week later the cassette deck arrived back from Commodore, with my letter which had been opened but not answered.

Needless to say I was not amused so I called Commodore. They considered they had done their bit by repairing the cassette deck and that was the end of the matter. By then I had decided enough was enough and returned everything to Dixons, who gave me credit. I must add that Dixons have been very good and most helpful.

I now have a Sharp MZ700 which has behaved impeccably.

Thank you for letting me air my pent-up frustrations.

J. Anderton, Ashby-de-la-Zouch, Leics

Marvellous Memotech

Having started computing on a ZX81, I upgraded to a Spectrum and then had the intention of further upgrading to the QL. However, not wanting to be at the end of a four-month queue I decided to change to another manufacturer (with whom I had had some experience due to its high quality add-ons for the ZX81). I therefore purchased the MTX 512.

As a point to note for all of you awaiting the QL, I posted my order for the MTX on a Monday and on the Wednesday of the same week I had it plugged in and running.

If you are still shopping around for a machine I would certainly recommend the Memotech series. Built in assembler/disassembler, four-channel sound, 16K video RAM and 32 sprites are only a few of its good points.

S. Drakeford, Rubery, Birmingham

Whoops!

Two lines in the Little Professor program for the Commodore 64, published in HCW 62, reproduced poorly in some copies. The two lines are:

```
90 IFRP=10THENPOKE
   1972,32 POKE1974,32
   POKE1975,32 POKE
   1977,32
97 IFRP=20THENPOKE
   1972,49 POKE1974,20
   POKE1975,15 POKE
   1977,57 RP=0
```

Autochar File for the TI-99/4A, reviewed in HCW 62, page 26, is available from Christine Computing, 6 Florence Close, Watford, Herts WD2 6AS.

I'm back in control

The debate about the morality and legality of tape copying continues. The points made against tapes designed specifically for copying other people's work are justified and reasonable.

There are other important issues, however, the most important being the rights that we have over our own computers.

Like many others, I purchase commercial software, not just for games appeal, but because of the quality of programming. I realise why software writers include routines to prevent illegal copying. But many interested computer owners find the inability to examine, modify or simply learn from software very frustrating.

Computer owners want to inquire into and customise programs, and thus expand their knowledge of their machines, adding to their own enjoyment.

I recently purchased a program which, among other features, incorporates a routine which puts me back in full control of my Spectrum. It allows me to stop BASIC or machine code programs without them crashing. I can now learn from my purchases without getting a black screen or a system nervous breakdown. I can utilise all my computer's functions.

I sympathise with software houses regarding illegal copying, but I would question the right of any person to dictate that certain of the keys on my computer must remain inactive, or even "lethal", when I use tapes I have purchased.

I will not be using the program to make illegal copies just because the SAVE option is now open to me. It is apparent that it was not designed for such a use.

I don't defend any software designed merely to copy programs, but I would defend very useful utility programs, like the one I bought, which re-instate my rights over my computer, and allow me to learn, not just play.

Sink the pirates, but splice the mainbrace for innovative programs which restore the rights of the computer user.

C.C. Mole, Burntwood, Staffs

We have edited this letter to remove the name of the utility program to which Mr Mole refers — some people are not as honest as he is and HCW does not want to encourage illegal copying. This does not mean we approve of all of the actions of software houses! We just don't approve of theft.

Thanks to all

I would like to thank HCW and the readers who offered help through your Letters page.

My One computer was unfortunately lost by the shop from which I purchased it. I eventually got most of the money back. I agree with D Howard and J M Stubbins that the One is a powerful computer. To demonstrate my faith in the machine I immediately purchased another.

I would like to apologise to One International. The reason for the hold-up was not entirely their fault.

When are we going to see all this educational software promised?

Once again, many thanks to HCW for its computer surgery, at a reasonable price.

J. M. Hopkins, Frome, Somerset

Oric open letter

Could I use your Letters page to ask Oric Products to solve my problem?

In January this year I returned my Oric-1 for repair. I received back a replacement Oric-1. The problem is that it will not load programs reliably.

I have written to Oric Products twice and all I have received is an offer of an Atmos upgrade. Undeterred, I sent a recorded delivery letter, and in reply I have just received another offer for an Atmos upgrade!

V.R.J. Wiacek, Amersham, Bucks

Any old TI mags?

Firstly, many thanks for supporting the TI 99/4A. I find HCW a VFM (value for money) magazine with interesting comments in your readers' letters.

I hope you will print many more TI 99/4A programs in the future. I have had my TI for one month. It took me a long time to save the money, as I am unemployed.

I wondered if any of your readers have any unwanted magazines for the TI 99/4A which I would find very useful. I would be most grateful if they could send me any old copies.

Many thanks for your help, keep up the good work.

W. Fairbairn, 5 Dumbarton Rd, Fort William, Inverness-shire PH33 6UU

Amstrad Info 1

I am writing to you about the new Amstrad micro. Could you give me the address for information on software and peripherals?

Carl Wheatley, Monmouth, Gwent

The Amstrad CPC 464 computers use an extended Microsoft like BASIC written by Locomotive Software. BASIC keywords are typed in letter for letter, but some can also be abbreviated. An example is the question mark for PRINT.

More details about the computers and peripherals can be had from Amstrad Consumer Electronics, Brentwood House, 169 Kings Road, Brentwood, Essex CM14 4EF. The company's software arm, Amsoft, is at the same address.

Amstrad Info 2

I read the article about the Amstrad computer (HCW 58) and wanted more information about this micro.

I was thinking about buying a Spectrum, but I was put off by the keywords written on the keys. I want something where you type in the word, and then it appears on the screen.

I would be very grateful for your help.

Leslie Mansock, Radford, Notts

Castle query

I am writing to thank you for producing an excellent magazine. I find your support for the Electron very encouraging, both reviews and listings.

Please can anyone help me? What do you do when you are in the castle in Quest for the Holy Grail, by Epic? I can get as far as the castle but I'm at a complete loss as to how to get out.

Richard Rennie, West Calder, West Lothian

Send your letters to Letters, Home Computing Weekly, No 1 Golden Square, London W1R 3AB. Don't forget to name your computer — the best letter could win £5-worth of software. Got a problem with your micro? We'll soon be starting a queries page, so send your technical questions to Queries at the above address.

Take over the board before your opponent

Use your skill and strategy to cover the screen in your own colour in this board game from Dave Martin for the unexpanded TI-99/4A

Hints on conversion

TI BASIC is fairly standard with two main exceptions. Single statement lines are used and subroutines for graphics and sound are available, prefixed with CALL, as detailed below

CALL CLEAR clears screen

CALL SCREEN defines screen colour

CALL CHAR defines a character with a 16-digit hex string from an eight by eight grid. Other machines will use a different method

CALL COLOUR (character set foreground, background) sets colour of character

CALL HCHAR (row, column, character code, number of repeats) places character on screen at co-ordinates specified and optionally repeats character horizontally

CALL VCHAR similar to HCHAR but repeats character vertically

CALL GCHAR (row, column, variable) similar to a screen PEEK on other machines. Gives the ASCII code at the given screen co-ordinates

CALL SOUND (D,F,V) gives sound of duration D, frequency F and volume V. Three sounds can be produced at once

This is a game of strategy for two players, the object being to win as many squares on an 8 x 8 grid as possible, the one gaining the most being the winner

Each player starts with two squares in the centre of the grid. To play you have to trap opposition squares between the square you are adding to the grid and one of your existing squares, horizontally, vertically or diagonally (it is only a valid move if you do so). The trapped squares then become yours and change to your colour

You play the game like this

First select the column number (1-9), the column number flashes, then the row (A-H)

If the square is already occupied then nothing happens and it is still your turn

If it is an invalid move then the selected square is displayed and then erased and it is still your turn.

Either of these conditions can be used to cancel an incorrect column choice

If it is a valid move then the trapped squares are changed to your colour, the running score is updated and the 'turn' indicator changes to the opposition colour and it is his turn

The game is finished when the grid is full. If a player cannot go then he must press 'N' which changes the colour of the 'turn' indicator and it is then his opponents turn.

How it works

100-320 define graphics
330-420 set up frame
430-520 number frame
530-780 set up start
790-1640 select square
1050-1510 check for trapped squares
1520 detects invalid move
1530-1580 changes over squares
1530-1630 changes over scoring variables
1640 detects end of game
1650-1680 changes over scoring variables
1690-1800 displays squares and scores
1810-1880 end of game subroutine
1890-1990 removes invalid move
2000-2120 running score subroutine

Variables

A,B,AA used to change over squares
BAD used to detect invalid move
NG number of goes
R row number
C column number
RR old row number
CC old column number
NR & NC used in detecting trapped squares
SQUARES count of trapped squares
NOTE tone played when squares changed
NUM used in flashing column number subroutine
GAIN,LOSS,RED,WHITE used in scoring
GAINC used in changing over scoring to next player
RED1,RED2,WHITE1,WHITE2 used in running score display

```
120 CALL SCREEN(5)
140 CALL CLEAR
150 REM   DEFINE FRAME*******
160 CALL CHAR(136,"FF80808080808080")
170 CALL CHAR(137,"FF01010101010101")
180 CALL CHAR(138,"80808080808080FF")
190 CALL CHAR(139,"01010101010101FF")
200 CALL COLOR(14,2,4)
210 REM   DEFINE WHITES*******
220 CALL CHAR(128,"FF80808080808080")
230 CALL CHAR(129,"FF01010101010101")
240 CALL CHAR(130,"80808080808080FF")
250 CALL CHAR(131,"01010101010101FF")
260 CALL COLOR(13,2,16)
270 REM   DEFINE REDS*********
280 CALL CHAR(144,"FF80808080808080")
290 CALL CHAR(145,"FF01010101010101")
300 CALL CHAR(146,"80808080808080FF")
310 CALL CHAR(147,"01010101010101FF")
320 CALL COLOR(15,2,7)
330 REM   CALL FRAME**********
340 CALL CLEAR
350 FOR I=9 TO 23 STEP 2
360 FOR Z=6 TO 20 STEP 2
370 CALL HCHAR(Z,I,136)
380 CALL HCHAR(Z,I+1,137)
390 CALL HCHAR(Z+1,I,138)
400 CALL HCHAR(Z+1,I+1,139)
410 NEXT Z
420 NEXT I
430 REM   NUMBER FRAME*******
440 FOR I=2 TO 8
450 CALL COLOR(I,16,1)
460 NEXT I
470 FOR I=9 TO 23 STEP 2
480 CALL HCHAR(5,I,(I+1)/2+44)
490 NEXT I
500 FOR Z=6 TO 20 STEP 2
510 CALL HCHAR(Z,8,Z/2+62)
520 NEXT Z
530 REM   SET UP START********
540 CALL HCHAR(12,3,144)
550 CALL HCHAR(12,27,128)
560 CALL HCHAR(12,5,48)
570 CALL HCHAR(12,6,50)
580 CALL HCHAR(12,29,48)
590 CALL HCHAR(12,30,50)
600 CALL HCHAR(12,15,128)
610 CALL HCHAR(12,16,129)
620 CALL HCHAR(13,15,130)
630 CALL HCHAR(13,16,131)
640 CALL HCHAR(14,17,128)
650 CALL HCHAR(14,18,129)
660 CALL HCHAR(15,17,130)
670 CALL HCHAR(15,18,131)
680 CALL HCHAR(12,17,144)
690 CALL HCHAR(12,18,145)
700 CALL HCHAR(13,17,146)
710 CALL HCHAR(13,18,147)
720 CALL HCHAR(14,15,144)
730 CALL HCHAR(14,16,145)
740 CALL HCHAR(15,15,146)
750 CALL HCHAR(15,16,147)
```

```
760 NG=0
765 TONE=440
770 GRIN=2
780 LOSS=2
790 REM    SELECT POSITION*****
800 A=144
810 B=128
820 CALL HCHAR(24,14,84)
830 CALL HCHAR(24,15,79)
840 CALL HCHAR(24,17,71)
850 CALL HCHAR(24,18,79)
860 CALL KEY(0,K,S)
870 CALL HCHAR(24,12,A)
880 IF S=0 THEN 860
890 IF K=78 THEN 1540
900 NUMB=K
910 C=(K-40)*2+7
920 IF (C<9)+(C>23)THEN 860
930 CALL KEY(0,K,S)
940 CALL HCHAR(5,C,32)
950 CALL HCHAR(5,C,NUMB)
960 IF S=0 THEN 930
970 R=(K-64)*2+4
980 RR=R
990 CC=C
1000 IF (R<6)+(R>20)THEN 930
1010 CALL GCHAR(R,C,UU)
1020 IF (UU=144)+(UU=128)THEN 860
1030 GOSUB 1690
1040 LOSS=LOSS+1
1050 REM    CHECK FOR LINES***
1060 SQUARES=0
1070 BAD=0
1080 FOR I=1 TO 8
1090 ON I GOTO 1100,1130,1160,1190,
     1220,1250,1280,1310
1100 NR=-1
1110 NC=0
1120 GOTO 1330
1130 NR=-1
1140 NC=1
1150 GOTO 1330
1160 NR=0
1170 NC=1
1180 GOTO 1330
1190 NR=1
1200 NC=1
1210 GOTO 1330
1220 NR=1
1230 NC=0
1240 GOTO 1330
1250 NR=1
1260 NC=-1
1270 GOTO 1330
1280 NR=0
1290 NC=-1
1300 GOTO 1330
1310 NR=-1
1320 NC=-1
1330 CALL GCHAR(R+2*NR,C+2*NC,X)
1340 IF X=B THEN 1370
1350 IF X=A THEN 1410
1360 GOTO 1480
1370 SQUARES=SQUARES+1
1380 R=R+2*NR
1390 C=C+2*NC
1400 GOTO 1330
1410 IF SQUARES=0 THEN 1480
1420 BAD=1
1430 GOSUB 1690
1440 R=R-2*NR
1450 C=C-2*NC
1460 SQUARES=SQUARES-1
1470 GOTO 1410
1480 R=RR
1490 C=CC
1500 SQUARES=0
1510 NEXT I
1520 IF BAD=0 THEN 1890
1530 NG=NG+1
1540 AA=A
1550 A=B
1560 B=AA
1570 IF A=128 THEN 1580 ELSE 1610
1580 RED=GAIN
1590 WHITE=LOSS
1600 GOTO 1630
1610 RED=LOSS
1620 WHITE=GAIN
1630 GOSUB 2010
1640 IF NG=60 THEN 1820
1650 GAINC=GAIN
1660 GAIN=LOSS
1670 LOSS=GAINC
1680 GOTO 860
1690 REM    CALL COLORS******
1700 CALL HCHAR(R,C,A)
1710 CALL HCHAR(R,C+1,A+1)
1720 CALL HCHAR(R+1,C,A+2)
1730 CALL HCHAR(R+1,C+1,A+3)
1740 CALL SOUND(-300,TONE,0)
1750 TONE=TONE+110
1760 IF TONE>2200 THEN 1770 ELSE 1780
1770 TONE=440
1780 GAIN=GAIN+1
1790 LOSS=LOSS-1
1800 RETURN
1810 REM  END ROUTINE********
1820 PRINT "AGAIN? (Y/N)     "
1830 CALL KEY(0,K,S)
1840 IF S=0 THEN 1830
1850 IF K=89 THEN 330
1860 IF K=78 THEN 1880
1870 GOTO 1830
1880 END
1890 REM  REMOVE BAD MOVE****
1900 R=RR
1910 C=CC
1920 NW=0
1930 CALL HCHAR(R,C,136)
1940 CALL HCHAR(R,C+1,137)
1950 CALL HCHAR(R+1,C,138)
1960 CALL HCHAR(R+1,C+1,139)
1970 CALL SOUND(100,-2,0,220,15,880,25)
1980 GAIN=GAIN-1
1990 GOTO 860
2000 REM  RUNNING SCORE*****
2010 IF RED<10 THEN 2070
2020 RED1=VAL(SEG$(STR$(RED),1,1))+48
2030 RED2=VAL(SEG$(STR$(RED),2,1))+48
2040 CALL HCHAR(12,5,RED1)
2050 CALL HCHAR(12,6,RED2)
2060 GOTO 2090
2070 CALL HCHAR(12,6,RED+48)
2080 CALL HCHAR(12,5,48)
2090 IF WHITE<10 THEN 2150
2100 WHITE1=VAL(SEG$(STR$(WHITE),1,1))+48
2110 WHITE2=VAL(SEG$(STR$(WHITE),2,1))+48
2120 CALL HCHAR(12,29,WHITE1)
2130 CALL HCHAR(12,30,WHITE2)
2140 GOTO 2170
2150 CALL HCHAR(12,30,WHITE+48)
2160 CALL HCHAR(12,29,48)
2170 RETURN
```

Pick of the week

Something for everyone in this mixed bag of goodies. Our reviewers have checked them over for you — here are the results

ZX Draughts 48K Spectrum £5.95

CP Software, 2 Glebe Road, Uxbridge, Middlesex

Draughts is a game that has weathered the ravages of time, and is still very popular, although what you would make of a partner who takes 14 minutes for a move is anybody's guess. That is roughly the time taken by the computer at level 9, although, to be fair, the response time at the lowest levels is very much quicker. The very long delay is a result of the 'full capture' search option, or so it says in the advertisement. With less than thirty-two squares to search through it makes me wonder what the computer gets up to for 14 minutes.

Nevertheless, you do get a very good game, even at lower levels of play. With only the level and 'capture search' options, and no choice of even board and piece colours, you get the feeling that you are not getting much for your money.

If you like draughts then this is as good a game as any I've seen even if it is a bit overpriced. **B B**

instructions	100%
playability	100%
graphics	75%
value for money	75%

★ ★ ★

Rurlabeast 48K Spectrum £5.95

Keran, 29 Gisburn Rd, Hessle Hull HU13 9HZ

This program lives up to its insert blurb of being an exciting game. I found it addictive. You are the last person left on Earth who can defend it against the marauding hordes of mutant Kens with only one tool — a shovel.

There are five levels with nine ladders. Your task is to run up and down ladders, digging holes for the green aliens to fall through and turn red. Next, you have to lure them into falling through a second hole to become larger, white super mutants.

The insert states there are 13 levels — but I'm afraid my co-ordination with the seven control keys is obviously so poor that I failed to leave screen one — even when all three aliens became the highest mutant form.

Isn't it possible to replay without having to go back to the title screen? So much time is needlessly wasted. When do points start to appear at screen top, and why is there no hall of fame? The program often crashed, producing martian style graphics, but even so, it is one to be recommended. **T W**

instructions	50%
playability	80%
graphics	70%
value for money	65%

★ ★ ★

Backgammon 48K Spectrum £5.95

CP Software, 2 Glebe Road Uxbridge, Middx

Now here is a game I have never played, so I was looking forward to having a go, especially as it is described as a version particularly suited to beginners. That may be so, because I soon got into the game and rather enjoyed playing, although you can only play against the computer, which is a pity.

A friend of mine tells me that this is not quite the correct game because there is something called a double dice option missing from this version. He showed me the game as written for the Spectrum by another firm, and there was a difference. Whether this would deter the serious player from playing this version I couldn't say.

Seeing the two versions enabled me to compare the two displays, and this version, in my opinion, has a more pleasing display, although it is slower in setting up the board. Bearing in mind the differences mentioned I will leave it to your judgement as to whether you would like to play this simplified version or not. **B B**

instructions	100%
playability	90%
graphics	90%
value for money	85%

★ ★ ★ ★

Reversi 48K Spectrum £5.95

CP Software, 2 Glebe Road, Uxbridge, Middx

Alas, poor Reversi. I know it well, even by another name. This well known board game is claimed by the vendors to be the strongest game of Spectrum Reversi on the market.

There is one feature of this version I have never seen before, and that is a system of handicapping by giving or taking any or all of the corners. I'm not sure this is in the rules of the game, but it does make for variety. You may, if you wish, change the colours of the display.

A constant display of scores and history of moves is there on the screen, which is handy. Watching the computer play itself can be fascinating, and you have the option of player versus player or player versus computer. If you choose to play the computer you will be given a good game at any level, though I suspect that at the higher levels you will be tempted to penalise the computer by giving yourself four corners' start.

Not a bad game, but there is nothing special about this version, certainly not enough to warrant the high price. **B B**

instructions	100%
playability	90%
graphics	80%
value for money	80%

★ ★ ★

Knight Driver 48K Spectrum £5.95

Hewson Consultants, Hewson House, 56b Milton Trading Estate, Abingdon, Oxon OX10 0EL

We are invited to race a car around a circuit in this colourful program from Hewson. There are two levels, professional and learner with automatic option, in which the computer drives. At professional level you have five lives, one being lost each time you veer off the road, while learner mode just limits running time.

The loading screen graphically explains which four keys control speed and direction. Screen bottom visually displays fuel use, screen left is the car on the circuit and screen right repeats the control instructions. Twisty roads take us through countryside, woodland and urban areas.

Although the computer makes it look simple, even at the learner level it is extremely hard to keep the car on the tortuous, narrow roads. Points are scored each time a section is passed without incident. At the end a lengthy report prolongs the replay time.

In the professional mode fuel display is replaced by five cars displaying lives. The controls are less responsive but scoring is higher.

Pity there is no hall of fame, and it takes so long to replay. **T W**

instructions	50%
playability	65%
graphics	75%
value for money	65%

★ ★ ★

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